



PHARMACEUTICAL PROBLEMS

AND

EXERCISES

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PHARMACEUTICAL

Problems and Exercises

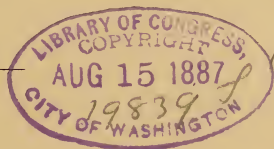
IN

METROLOGY, CHEMISTRY, PHARMACY AND PHARMA-
CEUTICAL NOMENCLATURE.

BY

✓
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PREFACE.

Problems to be solved in writing, and other written exercises, are indispensable in teaching or learning weights and measures, the mutual relations of weight and volume, the use of the pharmacopœial working formulæ, the proportionate strength of preparations, chemical notation, combining numbers, equations, pharmaceutical nomenclature, etc. The problems and exercises embraced in these pages are intended for the use of medical and pharmaceutical students—for class work at school, as well as for students not attending schools. They may be used also for examinations. When used for class exercises the students might use the Pharmacopœia as a reference book. Students working without instructors can prove their own work.

The number and variety of the problems and exercises are believed to be amply sufficient.

THE AUTHOR.

CHICAGO, JUNE, 1887.

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FORMULÆ.

For reducing Beaumé degrees to specific weight
and vice versa:—

For Liquids Heavier than Water.

$$\frac{145}{145-B^{\circ}} = \text{Sp. w.}; \quad 145 - \frac{145}{\text{Sp. w.}} = B^{\circ}$$

For Liquids Lighter than Water.

$$\frac{140}{130+B^{\circ}} = \text{Sp. w.}; \quad \frac{140}{\text{Sp. w.}} - 130 = B^{\circ}$$

For reducing Thermometric degrees from C. to F.
and vice versa:—

$$F = \frac{9}{5} C. + 32;$$

and

$$C = \frac{5}{9} (F - 32).$$

PROBLEMS AND EXERCISES.

PART I.

WEIGHTS AND MEASURES.

- 1.—State the length of the terrestrial meridian:— a) in meters? b) in inches?
- 2.—State the length of the Greenwich seconds pendulum:— a) in inches? b) in meters?
- 3.—State the difference in length between the yard and the meter:— a) in inches? b) in centimeters?
- 4.—Write:—
 - a) 103.072 meters, in centimeters?
 - b) 0.0001 meter, in millimeters?
 - c) 1010.101 decimeters, in dekameters?
 - d) 92.003 hektometers, in kilometers?
- 5.—Write, *in figures*:—
 - a) Thirteen millimeters, in meters?
 - b) Eleven thousand centimeters, in meters?
 - c) Two hundred and seven decimeters, in centimeters?
 - d) One-half kilometer, in dekameters?
 - e) One thousand and five millimeters, in centimeters?
 - f) One thousand and five centimeters, in millimeters?

6.—Write, in millimeters:—

- a) 1.0303 meters?
- b) 2 hektometers?
- c) 0.404 centimeters?
- d) 0.1 dekameter?
- e) 0.1 decimeter?
- f) 0.0001 kilometer?
- g) 0.100101 myriameter?

7.—Write, in meters:—

- a) 0.01 kilometer?
- b) 103.405 centimeters?
- c) 0.270 hektometers?
- d) 10.04001 millimeters?
- e) 3.45 dekameters?
- f) 345 decimeters?

8.—Add together:—one million micromillimeters, 75 millimeters, 75 centimeters, 4 dekameters, 4 decimeters, 0.004 kilometer, 13 hektometers, 4.13 meters, and 0.0002 myriameters, and state the sum in meters?

9.—State the equivalents, in English inches, of:—

- a) 3.03 meters?
- b) 3.03 millimeters?
- c) 0.303 centimeters?

10.—State the equivalents, in millimeters, of:—

- a) 4 inches?
- b) 1 foot?
- c) 0.01 inch?

11.—State the equivalents, in centimeters, of:—

- a) 1 inch?
- b) 4 feet?
- c) 0.1 inch?

12.—State the equivalents, in meters, of:—

a) 1 mile?

b) $7\frac{1}{2}$ yards?

c) 144 inches?

13.—How many square feet are contained in a rectangular area 2 feet wide and 30 inches long?

14.—How many square inches of surface has a cube measuring 2 inches in each direction?

15.—How many square centimeters of surface has a block 60 millimeters long, 30 millimeters wide, and 20 millimeters thick?

16.—How many square inches will equal one square meter?

17.—Reduce 0.03 square feet to square centimeters?

18.—Reduce one acre to square meters?

19.—Reduce 2 square miles to square kilometers?

20.—Add one square kilometer, one square meter, and one square centimeter, and state the sum in square meters?

21.—Add one square foot, 12 square inches, and $\frac{1}{3}$ square yard, and state the sum in square feet?

22.—How many cubic inches are contained in a block 6 inches long, 5 inches wide, and 4 inches thick?

23.—How many wine-gallons will be equivalent to 1 cubic foot?

24.—How many cubic feet of space in a room $12 \times 15 \times 10$ feet?

25.—State the equivalent of 1 cubic meter in cubic feet?

26.—State the equivalent of 1 cubic meter in liters?

27.—State the equivalent of one wine-gallon in cubic centimeters?

28.—How many cubic inches in:—a) 1 wine-gallon?
b) 1 imperial gallon? c) 8 imperial fluid ounces?
d) one liter? e) 16 U. S. fluid ounces? f) 1 imperial pint?

29.—How many cubic centimeters in:—a) 30.01 deciliters? b) 0.1 cubic decimeter? c) 0.303 liter? d) 13.003 centiliters? e) eleven hundred and one milliliters?

30.—How many C.c. in:—a) 1 U. S. fluid ounce?
b) 9 wine pints? c) 60 U. S. minims? d) 60 imperial minims.

31.—Add 4 liters and 40 milliliters, and state the sum in C.c.

32.—How many C.c. in $\frac{1}{3}$ of $\frac{1}{4}$ of 0.024 liter?

33.—Write:—

- a) 1040.401 milliliters in liters?
- b) 3.004 cubic-decimeters in C.c.?
- c) 140.03 liters in cubic-centimeters?
- d) 0.0002 liters in C.c.?
- e) 15,432 C.c. in cubic-decimeters?
- f) 304 centiliters in C.c.?

34.—Write, in figures:—

- a) Five thousand and seven C.c. in deciliters?
- b) Twenty-five hundred milliliters in liters?
- c) Two thousand and thirteen centiliters in cubic-centimeters?
- d) One-half milliliter in C.c.?

35.—Subtract 3,456 C.c. from 5 liters, and state the remainder in deciliters?

36.—State the equivalents, in U. S. fluid ounces, of:—

- a) 1 wine gallon?
- b) 1 imperial gallon?
- c) 1 liter?
- d) 16 imperial fluid ounces?
- e) 16 U. S. fluid drachms?

37.—State the equivalents, in U. S. minims, of:—

- a) 4.04 C.c.?
- b) 0.05 liter?
- c) 3 imp. fluid ounces.
- d) 15 C.c.?
- e) 1 milliliter?
- f) One-half wine-gallon?
- g) 1 U. S. liquid quart?
- h) 16 U. S. apothecaries' fluid ounces?
- i) 1 imperial pint?

38.—How many U. S. fluid drachms in:—

- a) 2.50 wine-pints?
- b) 1.05 wine-gallons?
- c) 0.125 U. S. fluid ounce?

39.—State the equivalents, in C.c., of:—

- a) $\text{f}\overline{\text{z}}\text{ij}$ $\text{f}\overline{\text{z}}\text{v}$ $\text{m}\overline{\text{xv}}\text{j}$?
- b) 1 wine pint?
- c) 1 U. S. fluid ounce?
- d) 300 U. S. minims?
- e) 300 imp. minims?
- f) 1 imperial pint?
- g) 1 imp. fluid ounce?

40.—State the equivalents, in liters, of:—

- a) 5 wine pints?
- b) 6 imp. pints?
- c) 100 U. S. fluid ounces?
- d) 100 imp. fluid ounces?

41.—State the equivalents, in imperial minims, of:—

- a) 1,000 U. S. minims?
- b) 0.10 liter?
- c) 1 C.c.?
- d) 1 U. S. fluid ounce?

- 42.—State the equivalents, in imperial fluid ounces, of:—
 a) 1 imperial gallon? b) 1 wine-gallon?
 c) 100 U. S. fluid ounces? d) 2 liters?
- 43.—State the equivalents, in wine pints, of 100 imperial pints?
- 44.—State the equivalent in imperial pints of 10 wine pints?
- 45.—How many cubic-inches in: a) 1 dry quart?
 b) 1 wine quart? c) 1 imperial quart?
- 46.—State the equivalents of:—
 a) 2 U. S. fluid ounces in imperial minims?
 b) 96 U.S. fluid ounces in imperial fluid ounces?
 c) 120 U. S. fluid ounces in imperial fluid-drachms?
 d) 960 U. S. minims in imperial minims?
- 47.—What is a Wine gallon? By what existing law is its value fixed?
- 48.—What is an Imperial gallon?
- 49.—What is a Liter?
- 50.—What is a Cubic centimeter?
- 51.—What is the Kilogram?
- 52.—What is the Troy Pound?
- 53.—What is the Avoirdupois Pound?
- 54.—What is the U. S. Mint Pound?
- 55.—What is the U. S. Apothecaries' Grain?
- 56.—Write 4 kilograms, 47 grams, and 4 centigrams in one sum, in Grams?
- 57.—Add 130 centigrams, 13 milligrams, 130 Grams, 13 kilograms, 1.30 dekagrams, and 0.013 hektograms, and state the sum in decigrams?

58.—Subtract 65 centigrams from 1 hektogram, and state the remainder in milligrams?

59.—Write in words:

- a) 0.0001 Gm in Gm?
- b) 0.0001 kilogram, in Gm?
- c) 0.01 milligram, in Gm?
- d) 0.100 Gm, in centigrams?

60.—How many Gm in:—

- a) 7093.307 centigrams?
- b) 0.07 milligram?
- c) 0.00306 kilogram?
- d) 304.5 dekagrams?

61.—How many milligrams in:—

- a) 0.048 Gm?
- b) 35.005 centigrams?
- c) 0.07005 kilograms?
- d) 7.4008 Gm?
- e) 0.0123 dekagram?
- f) 0.123 hektogram?

62.—Write in figures:—

- a) 4 kilograms, in dekagrams?
- b) 0.4 hektograms, in Gm?
- c) 0.003 Gm in milligrams?
- d) 0.202 Gm in centigrams?
- e) Eleven hundred centigrams, in Gm?
- f) One thousand and two milligrams in Gm?

63.—How many grains in:—

- a) a troy pound?
- b) an avoirdupois pound?
- c) a penny-weight?
- d) an Apothecaries' drachm?
- e) an avoirdupois drachm?

f) an avoirdupois ounce?

g) a scruple?

64.—State the number of;—

a) Milligrams in 1 decigram?

b) Centigrams in 1 hektogram?

c) Decigrams in 1 dekagram?

d) Kilograms in 1 Gram?

65.—State the number of:—

a) drachms in 1 troy ounce?

b) drachms in 1 U. S. Apothecaries' ounce?

c) drachms in 1 avoirdupois ounce?

d) ounces in 1 troy pound?

e) ounces in 1 avoirdupois pound?

66.—State the equivalents, in Gm, of:—

a) 6 avoirdupois ounces?

b) 9 troy ounces?

c) 5.50 avoirdupois pounds?

d) 0.50 avoirdupois pounds?

e) 1 troy ounce?

f) 1 avoirdupois ounce?

g) 500 grains?

67.—State the equivalents, in grains, of:—

a) 100,000 grams?

b) 1 centigram?

c) 1 decigram?

d) 1 milligram?

e) 65 milligrams?

68.—State the equivalents, in avoirdupois ounces, of:—

a) 0.40 kilogram?

b) 453 Gm.? c) 100 troy ounces?

69.—State the equivalents, in U. S. Apothecaries' ounces, of:—

- a) 1 avoirdupois pound?
- b) 1 kilogram.
- c) 100 avoirdupois ounces?
- d) 373 Gm?

70.—State the equivalents of:—

- a) 100 grains, in decigrams?
- b) 1,000 grains in centigrams?
- c) 1 grain, in milligrams?
- d) 10 grains, in Gm?
- e) 3 grains, in decigrams?

71.—State the relation of the wine gallon to the length of the seconds pendulum?

72.—State the relation of the milliliter to the quadrant of the earth?

73.—State the relation of the avoirdupois pound to the troy pound?

74.—State the relation of the Gram to the meter?

75.—State the relation of the grain to the imperial gallon?

76.—State the relation of the imperial gallon to the troy pound?

77.—State the relation of the U. S. dollar to the troy pound?

78.—State the relation of the Apothecaries' drachm to the troy ounce?

79.—State the weight *in vacuo* of:—

- a) 1 liter of water at 4° C., in kilograms?
- b) 576 C.c. of water at 4° C., in Gm?

- c) 1 C.c. of water at 4° C., in milligrams?
- d) 0.37 C.c. at 4° C., in centigrams?
- e) 500 milliliters of water at 4° C., in Gm?

80.—State the weight *in vacuo* of:—

- a) 1 cubic-decimeter of water at 4° C., in Gm?
- b) 1 cubic-centimeter of water at 4° C. in Gm?
- c) 1 cubic inch of water at $16^{\circ}.67$ C., in grains?
- d) 1 cubic foot of water at $16^{\circ}.67$ C., in imperial pounds?

81.—State the weight, in air, of:—

- a) 1 imperial gallon of water at 62° F.?
- b) 1 cubic inch of water at 62° F.?
- c) 1 cubic inch of water at 22° C.?
- d) 1 liter of water at 22° C., in Gm?
- e) 1 wine gallon of water at 22° C., in grains?

82.—State the apparent weight of:—

- a) 1 imp. fluid ounce of water, in grains?
- b) 1 U. S. Apothecaries' fluid ounce of water, in grains?
- c) 6 wine pints of water, in grains?
- d) 100 U. S. minims of water, in grains?
- e) 10 imp. minims of water, in grains?
- f) 1 imp. pint of water in avoirdupois ounces?

83.—State the apparent weight of:—

- a) 96 U. S. fluid ounces of water at $16^{\circ}.67$ C., in avoirdupois ounces?
- b) 1 liter of water at 4° C., in grains?
- c) 1 wine gallon of water at 62° F., in grains?
- d) 1 U. S. fluid ounce of water at 4° C., in troy ounces?

84.—State the apparent weight of:—

- a) 3 wine gallons of water at $16^{\circ}.67$ C., in avoirdupois ounces?
 - b) 1 liter of water at 22° C., in troy ounces?
- 85.—State the volume of:—
- a) 6.75 kilograms of water, at 4° C., in C.c.?
 - b) 160 avoirdupois ounces of water, at $16^{\circ}.67$ C., in imp. fluid ounces?
 - c) 100 avoirdupois ounces of water, at $16^{\circ}.67$ C., in U. S. fluid ounces?
 - d) 1,000 Gm of water, at 22° C., in C.c.?
 - e) 2 troy ounces of water, at 22° C., in U. S. minims?
 - f) 1 grain of water, at 22° C., in U. S. minims?
 - g) 10 grains of water, at 22° C., in imp. minims?

PART II.

PERCENTAGES AND PROPORTIONS IN PHARMACEUTICAL PREPARATIONS.

86.—State the percentage alcoholic strength of a mixture of 1 part of 60 per cent. (weight) alcohol and 2 parts of water.

87.—How much alcohol of 40 per cent. (weight) strength can be made from 1,000 Gm of alcohol of 80 per cent. strength?

88.—State the percentage (weight) alcoholic strength of a mixture of 2 parts official alcohol and 1 part water.

89.—How many parts alcohol of 80 per cent. strength (weight) can be obtained from 80 parts alcohol of 91 per cent. strength.

90.—How much water is required to dilute an alcohol of 50 per cent. strength to one of 45.5 per cent. (weight)?

91.—How many parts of alcohol of 45.50 per cent. strength can be made from 45.50 parts of alcohol of 91 per cent. strength (weight)?

92.—How much alcohol of 91 per cent. strength must be added to 100 parts of alcohol of 60 per cent. strength in order to produce a mixture of 80 per cent strength (weight)?

93.—How much alcohol of 94 per cent. (volume) strength, is required to make one pint alcohol of 66 per cent. (volume) strength?

94.—How much official alcohol is required to make 1 gallon of 80 per cent. (by volume) alcohol?

95.—How much official alcohol and how much official diluted alcohol must be mixed to produce one pint of 85 per cent. (by weight) alcohol?

96.—How much official ammonia water (10 per cent. gas) can be made from 10 lbs. of the "official stronger ammonia water?"

97.—How much official diluted acetic acid can be made from 6 lbs of the official glacial acetic acid?

98.—How much water must be added to 1 pound official acetic acid to reduce it to a 4 per cent. acid?

99.—How much of the official glacial acetic acid is required to make 2 pounds of the official diluted acetic acid?

100.—How much official "stronger water of ammonia" is required to make one-half gallon of the ten per cent. solution of N H_3 ?

101.—How much diluent must be added to a 70 per cent. solution to reduce it to 30 per cent.?

102.—How much water must be added to the official solution of tersulphate of iron to reduce its strength so that it contains 10 per cent. of the ferric sulphate?

103.—What quantities of water and cocaine hydrochlorate are required to make 2 drachms of a 2 per cent. solution?

104.—What quantities of water and of the official solution of chloride of iron are required to make one pound of a 10 per cent. solution of ferric chloride?

105.—How much caustic potassa containing 90 per cent. of potassium hydrate will be required to make 5

pounds of a solution containing 50 per cent. of the hydrate?

106.—How much basic ferric sulphate should be obtained on evaporating 200 ounces of the official solution of sub-sulphate of iron to dryness?

107.—State the percentage of absolute alcohol in the official menstruum for fluid extract of:—a) *nux vomica*. b) *digitalis*. c) *buchu*. d) *cinchona*. e) *frangula*. f) *sarsaparilla*. g) *taraxacum*. h) *senna*.

108.—State the percentage of absolute alcohol in the official menstruum for tincture of:—a) *calumba*. b) *ignatia*. c) *valerian*. d) *cinchona*. e) *kino*. f) *capsicum*. g) deodorized opium.

109.—State the percentage of subacetate of lead in Goulard's Cerate.

110.—State the percentage of camphor in Camphor Cerate.

111.—Aconite root yields about 16 per cent. solid extract to alcohol; how much extractive should be left upon evaporating 50 C.c. of the fluid extract?

112.—Socotrine aloes gives 22 per cent. water-extract; how much of the extract is equivalent to 9 grains aloes?

113.—How much Ergot is required to make 100 Gm of the official extract?

114.—How much tincture of *hyoscyamus* is equivalent to 15 C.c. of the fluid extract?

115.—Belladonna leaf yields about 22 per cent. extractive to a 66 per cent. alcohol; how much solid extract is contained in one ounce of a 15 per cent. tincture made with that menstruum?

116.—Indian cannabis yields 13 per cent. alcoholic extractive; how much of the fluid extract would be equivalent to 1 grain of the solid extract on that basis?

117.—If the average yield of extract from colocynth pulp be 33 per cent., and colocynth consists of 75 per cent. seed and 25 per cent. pulp; how much drug is required to make one pound compound extract of colocynth containing 16 per cent. of the simple extract?

118.—If digitalis yield 25 per cent. extractive to diluted alcohol, how much extractive is contained in the official tincture?

119.—Tincture of digitalis is 10 times the strength of the infusion, and the extract is 26 times the strength of the tincture; how much tincture, infusion, fluid extract, extract, and abstract, respectively, must be taken to represent 66 grains of the crude drug?

120.—How much extract of nux vomica ought to be obtained on evaporating 800 C.c. of the fluid extract?

121.—How much glycerin by volume is contained in 100 C.c. of the official fluid extract of krameria?

122.—Hyoscyamus yields 22 per cent. extractive to the official menstruum for its fluid extract; how much solid extract should remain upon evaporation of 40 C.c. of the fluid extract?

123.—a) What quantity of fluid extract of nux vomica corresponds in medicinal value to 10 Gm of the tincture? b) and how much of the abstract is equivalent to 1 grain of the solid extract if the yield of solid extract from the crude drug be $12\frac{1}{2}$ per cent?

124.—If opium yield 60 per cent. extractive to diluted alcohol, what would be the amount of extractive in 60 grains of the tincture?

125.—If a moist opium containing 10 per cent. morphine be dried, and is found to lose 20 per cent. of moisture in drying, what will be the percentage of morphine in the dried opium?

126.—If the yield of solid extract from *nux vomica* be $12\frac{1}{2}$ per cent., how much of the drug will be required to make 100 ounces of the extract?

127.—If the yield of resin of *podophyllum* be 4.50 per cent., how much mandrake will be required to make one pound of the resin?

128.—How much morphine is contained: a) in one ounce tincture of opium made from powdered opium containing $13\frac{1}{2}$ per cent. morphine? b) in 1 Gm tincture made from an opium containing 12 per cent. morphine?

129.—How much opium of 12 per cent. morphine strength and how much of 15 per cent. morphine strength must be taken to make: a) 1 pound opium containing $13\frac{1}{2}$ per cent. morphine? b) 500 Gm opium containing 14 per cent. morphine?

130.—*Physostigma* yields 3 per cent. extractive to the official alcohol, but 12 per cent. to a much weaker alcoholic menstruum; if the dose of the former extract be $\frac{1}{10}$ grain, what is the dose of the other, assuming that both menstrea will extract the whole of the active constituents?

131.—State the amount of solid extract yielded by one pound tincture of *physostigma* on the assumption that the crude drug yields 3 per cent. alcoholic extractive.

132.—How much fluid extract, tincture, and abstract of *podophyllum*, respectively, will be about equivalent to 1 Gm of the resin?

133.—How much squill is represented by one drachm of the syrup?

134.—How much fluid extract of senna is equivalent to 10 Gm of the syrup of senna, assuming that the cathartin is not injured by the heat employed in either preparation?

135.—How much tincture of stramonium equals 10 C.c. of the fluid extract?

136.—How much rhubarb is required to make one pound of the official tincture?

137.—How much morphine sulphate is contained in 10 grains of the Pulvis Morphinae Compositus?

138.—How much ferric chloride (anhydrous) is contained in one drachm tincture of ferric chloride?

139.—How much rhubarb is represented by one ounce of the official aromatic syrup of rhubarb?

140.—If the dose of the tincture of veratrum viride is 6 grains, what is the dose of the fluid extract?

141.—How much tartrate of antimony and potassium is contained in:—a) one drachm compound syrup of squill? b) one fluid drachm of the same syrup?

142.—How much elaterin is required to make one ounce of the “trituration”?

143.—How much morphine sulphate is required to make 10 Gm “trituration”?

144.—How much official syrup can be made from ten pounds of sugar?

145.—How much fluid extract of coto bark can be made from 3 pounds of the drug?

146.—How much quebraccho bark is required to make 24 fluid ounces of the fluid extract?

147.—How much aloes is represented by 3 Gm of the tincture?

148.—How much tincture of aloes is equivalent to 10 grains of the drug?

149.—How much tincture of opium represents 1 grain of powdered opium?

150.—How much camphorated tincture of opium represents 1 grain of opium?

151.—How much arsenous oxide is represented by 20 minims of Fowler's solution?

152.—How much Donovan's solution represents the therapeutic value of $\frac{1}{32}$ grain of arsenous oxide?

153.—How much glycerin and how much extractive are contained in tincture of nutgall, the drug yielding 60 per cent. of extractive to diluted alcohol?

154.—What is the minimum amount of total alkaloids that should be found in:—a) 1,000 grains tincture of cinchona? b) 1 ounce fluid extract of cinchona?

155.—State the amount of quinine that ought to be contained in 60 grains extract of cinchona, the yield of extract from the bark being 14 per cent.

156.—If nux vomica contain 3 per cent. total alkaloids, what should be the amount of total alkaloids found in: a) 1 ounce of the official tincture? b) 10 grains of the official extract? c) 1 fluid drachm of the fluid extract?

157.—Assuming that aconite root contains 0.50 per cent. alkaloids, that the yield of alcoholic extract is 16 per cent., and that the initial adult dose of that extract is $\frac{1}{8}$ grain; and assuming further that aconite leaf contains 0.05 per cent. total alkaloids and yields 20 per cent. extract;—what will be the initial dose of extract of aconite leaf?

158.—a) What materials are required to make 1 pound syrup of phosphate of iron with quinine and strychnine, and b) how much strychnine is contained in 6 Gm of the preparation?

159.—What materials are required for 1 pound syrup of the hypophosphites, and how much of total hypophosphites is contained in 100 grains of it?

Enumerate the materials and state what quantity of each is required for preparing:—

160.—5 pounds ointment.

161.—1 kilogram elixir of orange.

162.—1 pound mucilage of acacia.

163.—1 pound mucilage of tragacanth.

164.—5 pounds mercurial ointment.

165.—2 ounces chloroform mixture.

166.—8 ounces aromatic powder.

167.—4 ounces Dover's powder.

168.—500 Gm compound rhubarb powder.

169.—1 liter aromatic spirit of ammonia.

170.—2 pounds syrup of rhubarb.

171.—1 pound aromatic syrup of rhubarb.

172.—5 pounds compound syrup of sarsaparilla.

173.—200 Gm vinegar of opium.

174.—500 Gm cantharidal cerate.

175.—1 pound cerate.

176.—1 pound confection of senna.

177.—20 ounces compound decoction of sarsaparilla.

178.—450 Gm belladonna plaster.

179.—1 pound adhesive plaster.

180.—5 pints compound fluid extract of sarsaparilla.

181.—300 C.c. aromatic fluid extract.

Enumerate the materials and state what quantity of each is required for preparing:—

182.—8 ounces infusion of digitalis.

183.—4 ounces compound infusion of senna.

184.—1 pound liniment of ammonia.

185.—2 pounds ointment of zinc oxide.

186.—4 ounces oleate of mercury.

187.—1 pound mistura rhei et sodæ.

188.—3 kilograms tinctura aloes.

189.—500 Gm tinctura saponis viridis.

190.—1 pound tinctura lavendulæ composita.

191.—2 pounds tinctura zingiberis.

192.—1 pound syrupus scillæ compositus.

193.—2 ounces pulvis glycyrrhizæ compositus.

194.—1 pound tinctura catechu composita.

195.—4 pounds tinctura gentianæ composita.

196.—2 pounds tinctura cinchonæ composita.

197.—8 ounces extractum colocynthis compositum.

198.—4 ounces linimentum calcis.

199.—100 Gm linimentum camphoræ.

200.—4 pounds linimentum saponis.

201.—1 pint liquor potassii arsenitis.

202.—500 C.c. liquor arseni et hydrargyri iodidi.

203.—1 pound tinctura rhei aromatica.

204.—1 pound tinctura valerianæ ammoniata.

205.—50 Gm massa copaibæ.

206.—1 pound massa hydrargyri.

207.—2 ounces mistura cretæ composita.

208.—500 Gm tinctura cardamomi composita.

209.—1 gallon Labarraque's solution.

210.—4 ounces citrine ointment.

Enumerate the materials and state what quantity of each is required for preparing:—

- 211.—4 ounces cold cream.
- 212.—4 pounds paregoric elixir.
- 213.—2 pounds laudanum.
- 214.—1 pound brown mixture.
- 215.—4 ounces Vallet's mass.
- 216.—8 ounces Griffith's mixture.
- 217.—4 ounces Basham's mixture.
- 218.—8 ounces Dewee's carminative.
- 219.—1 pound Friar's balsam.
- 220.—1 kilogram tincture of iron.
- 221.—1 ounce iodine ointment.

PART III.

SPECIFIC WEIGHT AND SPECIFIC VOLUME.

222.—What are the differences between universal gravity, weight, and specific weight?

223.—A piece of metal weighs 7 ounces; the same volume of water weighs 1 ounce: what is the specific weight of the metal?

224.—A piece of metal weighs 6,445.380 grains when weighed in air; when weighed suspended in water its apparent weight is 5,585.996 grains; its bulk is 3.40 cubic inches: what is the specific weight of the metal? and what is the weight of a cubic inch of water?

225.—A piece of brass weighs 480 grains in air, 420 grains in water, and 400 grains in a solution of sugar: what is the volume of 500 Gm of that solution?

226.—One liter of water at 4° C. weighs, *in vacuo*, one kilogram; does it weigh more or less than 1,000 Gm when weighed in air?

227.—Which is the heavier, a kilogram weight of brass or a kilogram weight of platinum when both are weighed in a vacuum?

228.—Which is really heavier, a pound of wood or a pound of lead?

229.—What is the difference between *true* and *apparent* weight?

230.—What is the difference between *true* and *apparent* specific weight?

231.—State the law of Archimedes?

232.—A solid measuring 0.1 cubic decimeter is weighed first *in vacuo*, then in air, and lastly in water; one cubic inch of air weighs 0.3 grains, and a cubic inch of water 252.50 grains.

Find:—

a) The difference between the weight of that solid *in vacuo* and its weight in air?

b) The difference between its weight in air and its weight in water?

233.—The weight of air and of water being assumed to be as stated in problem 232, what is the weight of a cubic inch of metal having the specific weight 10.000?

234.—A ten dollar gold coin weighs 258 grains in air; assuming its specific weight to be 18.30, what is its apparent loss of weight when weighed suspended in water?

235.—A one-thousand grain pycnometer holds 720 grains of ether; what is the specific weight of the ether?

236.—A bottle holds 480 grains of water, but 576 grains of nitric acid; what is the specific weight of that nitric acid?

237.—If twenty imperial fluid ounces of a liquid weigh $1\frac{1}{4}$ avoirdupois pounds, what is the specific weight of that liquid?

238.—A fluid ounce of alcohol at 22°C . weighs 373 grains, and a fluid ounce of water at the same temperature weighs 455 grains; what is the specific weight of that alcohol referred to water at 22°C . as = 1.000? And will the number expressing its specific gravity be greater

or less when referring to water at 22°C . as unit, than when referring to water at 15°C.c . as unit?

239.—A liter of diluted alcohol weighs 925 Gm; what is the sp. w. of that alcohol?

240.—A liter of glycerin weighs 1,250 Gm; what is its sp. w.?

241.—The sp. w. of chloroform being 1.500, what is the weight of 900 C.c.?

242.—What is the weight of one liter of any liquid having the sp. w. 0.750?

243.—What is the volume of 370 Gm of any liquid of 0.800 sp. w.?

244.—If an imperial gallon of sulphuric acid weigh 18.35 avoirdupois pounds, what is the volume of 1,000 Gm of that acid expressed in C.c.?

245.—If a piece of metal weigh 9 ounces in the air, 8 ounces in water, and 8.10 ounces in oil, what is the specific *volume* of that oil?

246.—If a bottle hold one-half ounce of water, but will hold five drachms of a certain solution of sodium carbonate, what is the sp. w. of that solution?

247.—If a piece of metal which has a bulk of 16.17 cubic inches be found to weigh 347,624.55 grains in air, and 306,839.75 grains in water, what is the weight in grains of 1 wine-gallon of water?

248.—If an imperial pint of syrup weigh 26 avoirdupois ounces, what is the volume of 1 kilogram of that syrup?

249.—If 1 part of physostigma will make 10 parts by weight of the tincture, the menstruum used being alcohol of 0.820 sp. w., how many Gm of physostigma will be required to make two liters of the tincture?

250.—If one gallon of ether and one-half gallon of chloroform have the same weight, and two pints of chloroform weigh the same as three pints of water, what is the sp. w. of the ether?

251.—If the sp. w. of oil of vitriol be twice that of olive oil, and if one liter of olive oil weigh 917 Gm, what is the weight of 500 C.c. of oil of vitriol?

252.—If a solid weigh 75 ounces, and the same volume of water 10 ounces, what is the apparent weight of that solid when weighed suspended in water?

253.—If a bullet weigh 13 ounces in air and 12 ounces in water, what will it appear to weigh in a liquid having 1.40 sp. w.?

254.—If a pound of water measure $15\frac{3}{8}$ fluid ounces, and a pound of a certain solution $7\frac{1}{16}$ fluid ounces, what is the specific volume of that solution?

255.—What number of C.c. expresses the volume of 85.33 Gm of a liquid having 1.01 sp. vol.?

256.—What number of Gm expresses the weight of 13.476 liters of a liquid having 1.100 sp. w.?

257.—If a graduated cylinder contain 30 C.c. of water, and if a solid weighing 13 Gm and dropped into the water raises the level of the water to 40 C.c., what is the sp. w. of the solid?

258.—What is the weight of one liter solution of mercury nitrate, in kilograms, the sp. w. being 2.10?

259.—Solution of citrate of iron has the sp. w. 1.26; what is the weight of one wine pint in avoirdupois ounces?

260.—The weight of 3 gallons of water is 400 avoirdupois ounces, and the weight of 1 gallon of alcohol is

109 avoirdupois ounces; what is the sp. w. of the alcohol?

261.—An imperial gallon of oil of peppermint weighs 9 avoirdupois pounds; what is its sp. w.?

262.—Six wine pints of solution of zinc chloride weighs 155.5 avoirdupois ounces. What is its sp. w.?

263.—The sp. w. of oil of turpentine being 0.860, what is the weight of 96 U. S. fluid ounces of it, in avoirdupois ounces?

264.—A certain bottle will hold 100 ounces of glycerin; how many ounces will it hold of:—a) ether? b) water? c) chloroform? d) syrup? e) alcohol? f) solution of chloride of iron?

265.—If a crystal weighs 10 Gm in air, and 9 Gm in oil of turpentine, the sp. w. of that oil being 0.860, what is the sp. w. of the crystal?

266.—A piece of cork is found to weigh 0.732 Gm when weighed in air; a piece of metal weighs 7.7 Gm in air, but only 6.6 Gm in water; the cork and metal tied together and weighed in water are found to weigh 4.182 Gm: what is the sp. w. of the cork?

267.—Which is the greater, the sp. w. of acetic acid referring to water at 4°C . as unit, or the sp. w. of the same acid referring to water at 15°C . as unit?

268.—A certain liquid at 39.2°F . has the sp. w. 1.200 referring to water at 22°C . as unit; will the number expressing its sp. w. at 60°F ., referring to water at 4°C . as unit, be greater or less than 1.200?

269.—The weight of one liter of water at 4°C . is 15,424 grains; but the weight of 500 C.c. of water at 22°C . is 7,696 grains. a) What is the sp. w. of water at 22°C . referring to water 4°C . as unit? and b) what is

the sp. w. of water at 4°C . referring to water at 22°C . as = 1.000?

270.—An imperial gallon of water at 62°F ., barometer at 30 inches, weighs 70,000 grains; a) does it weigh more or less at 15°C .? and b) does it weigh more or less when the atmospheric pressure is greater?

271.—A cubic inch of water at 22°C . weighs 252.5 grains. What is the weight of one wine gallon of an alcohol having 0.860 sp. w., referring to water at 22°C . as = 1.000?

272.—What is the weight at $15^{\circ}.55\text{ C}$. of:—

- a) 1 liter official alcohol?
- b) 1 wine pint official alcohol?
- c) 1 imperial gallon official alcohol?
- d) 1 imperial pint official diluted alcohol?
- e) 1 wine pint official diluted alcohol?

273.—What is the volume, at 22°C ., of:—

- a) 1 kilogram official alcohol?
- b) 3 avoirdupois pounds official alcohol?
- c) 16 U. S. Apothecaries' ounces of alcohol?
- d) 1 wine pint of water?

274.—What is the volume of 100 troy ounces of oil of 0.9 sp. w., if one cubic inch of water weighs 252.5 grains?

275.—A liquid has the sp. w. 0.95; what is its sp. vol?

276.—The sp. vol. of a liquid is 0.80; what is its sp. w.?

277.—What is the specific volume corresponding to each of the following specific weights, respectively:—

- a) 1.000? b) 1.250? c) 1.333?
- d) 0.500? e) 0.750? f) 0.800?
- g) 2.000? h) 0.720? i) 0.820?
- k) 1.500? l) 1.300? m) 1.320?

278.—What are the specific volumes, respectively, of:
—a) alcohol? b) diluted alcohol? c) ether? d) solution of ferric citrate? e) solution of subacetate of lead? f) solution of chloride of iron?

279.—What is the volume of 1,000 Gm of a liquid having the sp. vol. 1.20?

280.—What is the volume, in imperial fluid ounces, of 100 avoirdupois ounces of a liquid having the sp. vol. 0.800?

281.—What is the volume in U. S. fluid ounces of 25 avoirdupois ounces of a liquid having the sp. vol. 1.000?

282.—What number of C.c. expresses the volume of 85 Gm of a liquid having the sp. w. 1.01?

283.—What number of C.c. expresses the volume of 85 Gm of a liquid having the sp. vol. 1.01?

284.—What number of Gm expresses the weight of 85 C.c. of a liquid having the sp. w. 1.01?

285.—What number of Gm expresses the weight of 85 C.c. of a liquid having the sp. vol. 1.01?

286.—What is the weight of one U. S. Apothecaries' fluid ounce of each of the following named liquids:—
a) water? b) alcohol? c) diluted alcohol? d) syrup? f) glycerin? g) ether? h) stronger ether? i) chloroform? k) sulphuric acid? l) nitric acid?

What materials, and quantities of each, are required for preparing:—

287.—1 gallon syrup.

288.—1 pint spirit of ether.

289.—1 liter diluted sulphuric acid.

290.—1 quart diluted phosphoric acid.

291.—1 gallon diluted acetic acid.

What materials, and quantities of each, are required for preparing:—

292.—12 fluid ounces tincture of ferric acetate.

293.—1 pint tincture of ferric chloride.

294.—100 fluid ounces solution of normal ferric sulphate.

295.— $\frac{1}{2}$ gallon diluted alcohol.

296.—1 liter diluted hydrochloric acid.

297.—1 pint solution of ferric citrate.

298.—8 fluid ounces solution of subsulphate of iron.

299.—500 C.c. solution of mercuric nitrate.

300.—1 quart solution of subacetate of lead.

301.—1 pint solution of zinc chloride.

302.—1 quart mucilage.

303.—1 liter solution of ferric chloride.

304.—1 pint solution of ferric acetate.

305.—1 gallon tincture of opium (sp. w. 0.935).

306.—1 quart aromatic sulphuric acid.

307.—1 gallon solution of potassa.

308.—1 liter aromatic spirit of ammonia.

309.—How much ferric chloride is contained in 1 fluid drachm of the official tincture of chloride of iron?

310.—How much acetate of iron is contained in 20 minims of the official tincture?

311.—How many grains of morphine should be found in one U. S. fluid ounce of the official tincture of opium prepared from powdered opium containing 16 per cent. morphine and having 0.935 sp. w.?

312.—How many grains of morphine should be found in a tincture made from powdered opium containing $13\frac{1}{2}$ per cent. morphine and having the sp. w. 0.935?

PART IV.

CORRECTIONS FOR TEMPERATURE--- BEAUME'S HYDROMETERS, AND THE THERMOMETRIC SCALES OF CELSIUS AND FAHRENHEIT.

313.—If the alcoholometer when placed in a jar of alcohol indicates 60 per cent. at a temperature of 55°F. , what is the percentage strength of that alcohol at the standard temperature of the Revenue Service?

314.—If the sp. w. of alcohol taken at 15°C. be 0.870, what is the sp. w. at 22°C. ?

315.—If the sp. w. of alcohol observed at 20°C. be 0.889, what would be its sp. w. at 15°C. ?

316.—If the sp. w. of an ammonia solution at 21°C. be 0.900, a) what is its sp. w. at 15°C. ? and b) at 14°C. ?

317.—If alcohol at 22°C. , when tested by the alcoholometer, appears to be 20 degrees above proof, what is its real strength in degrees proof by the standard of the Revenue Service?

318.—If the observed sp. w. of hydrochloric acid be 1.14 at 22°C. , what is its sp. w. at 15°C. ?

319.—If the observed sp. w. of nitric acid be 1.40 at 18°C. , what is its sp. w. at 22°C. ?

320.—If the sp. w. of acetic acid at 22°C. be 1.070, what is its percentage strength, and what is its sp. w. at 15°C. ?

321.—If the observed sp. w. of a sulphuric acid at 21°C . be 1.700, what is its sp. w. at 18°C .?

BEAUME'S HYDROMETERS.

322.—Reduce 20 degrees of Beaume's acidometer to sp. w.

323.—Reduce 16 degrees of Beaume's spirit hydrometer to sp. w.?

324.—Reduce 30 degrees of Beaume's spirit hydrometer to sp. w.?

325.—Reduce 40 degrees of Beaume's acidometer to sp. w.?

326.—Reduce sp. w. 1.42 to degrees Beaume?

327.—Reduce 0.720 sp. w. to Beaume degrees?

328.—Reduce 0.960 sp. w. to Beaume degrees?

329.—Reduce 1.250 sp. w. to Beaume degrees?

330.—Reduce 0.900 sp. w. to Beaume degrees?

331.—Reduce 0.860 sp. w. to Beaume degrees?

332.—Reduce 1.160 sp. w. to Beaume degrees?

333.—Reduce 1.843 sp. w. to Beaume degrees?

334.—Reduce 26° Beaume's spirit hydrometer to sp. w.?

THERMOMETER SCALES.

335.—Reduce 300°C . to degrees F.?

336.—Reduce 140°F . to degrees C.?

337.—Reduce 70°C . to degrees F.?

338.—Reduce 17°C . to degrees F.?

339.—Reduce 15°C . to degrees F.?

340.—Reduce 15°F . to degrees C.?

341.—Reduce 600°F . to degrees C.?

342.—Reduce 20° F. to degrees C.?

343.—Reduce 180° F. to degrees C.?

344.—Reduce 10° F. to degrees C.?

345.—Reduce 20° C. to degrees F.?

346.—Reduce 4° C. to degrees F.?

347.—Reduce 32° F. to degrees C.?

PART V.

CHEMICAL SYMBOLS AND FORMULÆ.

348.—Write the symbols of:—

- a) aluminium, b) arsenic, c) iron,
d) bismuth, e) gold, f) lead?

349.—Write the names of the elements represented by:—a) Sb, b) Zn, c) Mg, d) O, e) Sr?

350.—Write the names of the elements represented by:—a) N, b) Bi, c) Pb, d) Ag, e) Na?

351.—Write the symbols for:—a) potassium, b) nitrogen, c) boron, d) manganese, e) carbon?

352.—Write the names of the elements represented by:—a) H, b) Br, c) Hg, d) Ca, e) P, f) I?

353.—Write the symbols for:—a) copper, b) calcium, c) sodium, d) magnesium, e) chromium, f) cobalt, (g) platinum?

354.—Write the symbols for:—a) lithium, b) bromine, c) tin, d) antimony, e) silver?

355.—Write the formulæ for the molecules of:—a) hydrogen, b) oxygen, c) calcium, d) chlorine, e) bromine, f) nitrogen, g) mercury, h) cadmium, i) phosphorus.

356.—What is the valence of:—a) Cl, Ag, K, and H; b) O, S, Ca, Zn, Hg and Cu; c) C, Al, Pb, Si, and Sn; d) N, P, As, Sb, and Bi; e) Mn, Fe, Cr and Co?

357.—State the basicity of:—a) hydrochloric acid; b) hydrocyanic acid; c) sulphuric acid; d) phosphoric

acid; e) tartaric acid; f) acetic acid; g) citric acid;
h) pyrophosphoric acid; i) nitric acid; k) chloric acid;
l) salicylic acid?

358.—Write the molecular formulæ for:—

- a) hydrochloric acid, b) ozone,
- c) potassium iodide, d) lead oxide.
- e) silver chloride, f) mercurous chloride.

359.—Write the molecular formulæ for:—

- a) carbon dioxide, b) arsenous oxide,
- c) water, d) sulphurous anhydride.

360.—Write the molecular formulæ for:—

- a) ammonia, b) carbon monoxide,
- c) nitrogen tetroxide, d) ferric oxide,
- e) calcium oxide?

361.—Write the molecular formulæ for:—

- a) mercurous iodide, b) mercurous chloride,
- c) mercuric chloride, d) mercuric oxide,
- e) silver oxide, f) bismuthous oxide?

362.—Write the molecular formulæ for:—

- a) potassium hydrate, b) ferric chloride,
- c) aluminium hydrate, d) ferric hydrate,
- e) calcium hydrate?

363.—Write the molecular formulæ for:—

- a) antimonious oxide, b) arsenous oxide,
- c) antimony sulphide, d) silver nitrate,
- e) sodium carbonate.

364.—Write the molecular formulæ for:—

- a) calcium carbonate, b) potassium bicarbonate,
- c) ferrous sulphate, d) cupric sulphate?

365.—Write the molecular formulæ for:—

- a) alum, b) ammonium carbonate,
- c) sodium phosphate, d) Rochelle salt,
- e) potassium bitartrate?

366.—Write the molecular formulæ for:—

- a) bismuth subnitrate,
- b) sodium pyrophosphate,
- c) tartrate of antimony and potassium,
- d) ferrocyanide of potassium?

367.—Write the molecular formulæ for:—

- a) methane, b) alcohol,
- c) sulphuric acid, d) acetic acid,
- e) starch, f) cane sugar,
- g) ether, h) chloroform.

368.—Write the molecular formulæ for:—

- a) glycerin, b) salicylic acid,
- c) citric acid, d) tartaric acid,
- e) oleic acid, f) phenol?

369.—Write the molecular formulæ for:—

- a) sodium salicylate, b) lithium benzoate,
- c) ammonium valerate, d) zinc sulphocarbolate,
- e) morphine, f) quinine?

370.—What substances are represented by the formulæ:—

- a) Ag_2 , b) CaBr_2 , c) NaOH , d) PbO ,
- e) HgI_2 , f) HgO , g) CaCO_3 ?

371.—What substances are represented by:—

- a) NaHCO_3 , b) HNO_3 , c) CN ,
- d) $\text{Fe}_2(\text{OH})_6$, e) $\text{C}_2\text{H}_5\text{OH}$, f) ZnSO_4 ?

372.—What substances are represented by:—

- a) $\text{Ca}(\text{OH})_2$, b) $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$,
 c) $\text{Fe}_2(\text{SO}_4)_3$, d) N_2O_4 ,
 e) HgCl_2 , f) NH_4OH ?

373.—What substances are represented by:—

- a) Sb_2S_3 , b) $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$,
 c) NaClO , d) P_2O_5 ,
 e) PbSO_4 , f) Hg_2Cl_2 ?

374.—What substances are represented by:—

- a) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$, b) H_3BO_3 ,
 c) $\text{Na}_4\text{As}_2\text{O}_7$, d) $\text{Na}_4\text{P}_2\text{O}_7 \cdot 10\text{H}_2\text{O}$,
 e) $\text{C}_6\text{H}_9\text{NO}_2\text{O}_5$,
 f) $(\text{ZnCO}_3)_2 \cdot 3\text{Zn}(\text{OH})_2$?

375.—What substances are represented by:—

- a) $\text{K}_2\text{Al}_2(\text{SO}_4)_4 \cdot 24\text{H}_2\text{O}$,
 b) $\text{C}_5\text{H}_{11}\text{OH}$, c) $(\text{C}_2\text{H}_5)_2\text{O}$,
 d) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, e) NH_4Cl ?

376.—What substances are represented by:—

- a) $\text{HC}_7\text{H}_5\text{O}_2$, b) CaS_2O_3 ,
 c) $\text{Na}_2\text{CO}_3 \cdot 2\text{H}_2\text{O}$, d) Hg_2SO_4 ,
 e) K_2MnO_4 , f) $\text{K}_2\text{Mn}_2\text{O}_8$?

377.—What substances are represented by:—

- a) $\text{Al}_2\text{O}_3 \cdot 3\text{Na}_2\text{O}$, b) $\text{Ca}(\text{H}_2\text{PO}_4)_2$,
 c) $\text{KSbOC}_4\text{H}_4\text{O}_6 \cdot \text{H}_2\text{O}$,
 d) $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$, e) KClO_3 ,
 f) $2\text{SbCl}_3 \cdot 5\text{Sb}_2\text{O}_3$,
 g) $\text{CaH}_4(\text{PO}_4)_2$?

378.—What substances are represented by:—

- a) $\text{C}_6\text{H}_5\text{OH}$, b) $\text{H}_2\text{C}_4\text{H}_4\text{O}_6$,
 c) $\text{H}_2\text{C}_2\text{O}_4$, d) $\text{HC}_2\text{H}_3\text{O}_2$, e) $\text{H}_3\text{C}_6\text{H}_5\text{O}_7$,
 f) $\text{HC}_{18}\text{H}_{33}\text{O}_2$, g) SbCl_3 ?

379.—What substances are represented by:—

- a) $\text{HC}_7\text{H}_5\text{O}_3$, b) $\text{H}_2\text{C}_5\text{H}_2\text{N}_4\text{O}_3$,
- c) $\text{H}_4\text{P}_2\text{O}_7$, d) $\text{Zn}(\text{C}_5\text{H}_9\text{O}_2)_2 \cdot \text{H}_2\text{O}$,
- e) $(\text{NH}_4)_2\text{HPO}_4$,
- f) $\text{C}_6\text{H}_9\text{NO}_2\text{O}_5$, g) CHCl_3 ?

380.—What substances are represented by:—

- a) $\text{K}_3\text{C}_6\text{H}_5\text{O}_7$, b) $2\text{LiC}_7\text{H}_5\text{O}_3\text{H}_2\text{O}$,
- c) $\text{NH}_4\text{HCO}_3\text{NH}_4\text{NH}_2\text{CO}_2$,
- d) $\text{C}_{17}\text{H}_{19}\text{NO}_3, \text{HC}_2\text{H}_3\text{O}_2 \cdot 3\text{H}_2\text{O}$,
- e) $(\text{C}_{20}\text{H}_{24}\text{N}_2\text{O}_2)_2\text{H}_2\text{SO}_4 \cdot 15\text{H}_2\text{O}$?

PART VI.

ATOMIC AND MOLECULAR WEIGHTS.

State the atomic weights of:—

- 381.— a) chlorine, b) iodine,
 c) hydrogen, d) iron,
 e) oxygen, f) sodium,
 g) lithium, h) arsenic.
- 382.— a) carbon, b) calcium,
 c) bismuth, d) lead,
 e) magnesium, f) mercury,
 g) silver, h) antimony.
- 383.— a) nitrogen, b) oxygen,
 c) phosphorus, d) potassium,
 e) sulphur, f) zinc,
 g) copper, h) aluminium.
-

State the molecular weights of:—

- 384.— a) H_2O , b) NH_3 , c) CaO ,
 d) KOH , e) NaOH , f) $\text{Ca}(\text{OH})_2$.
- 385.— a) HCl , b) H_2SO_4 , c) HNO_3 ,
 d) $\text{Fe}_2(\text{SO}_4)_3$, e) HgCl_2 ,
 f) NH_4OH , g) $\text{FeCl}_2 \cdot 4\text{H}_2\text{O}$.
- 386.— a) As_2O_3 , b) CaCl_2 ,
 c) KClO_3 , d) MnO_2 ,
 e) H_3PO_4 , f) NH_4Cl .
- 387.— a) NaCl , b) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, c) CaCO_3 ,
 d) $\text{Fe}_2(\text{OH})_6$, e) K_2CrO_4 .

State the molecular weights of:—

- 388.— a) $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$,
b) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$,
c) NaHCO_3 , d) KHCO_3 ,
e) $\text{K}_4\text{FeC}_6\text{N}_6 \cdot 3\text{H}_2\text{O}$,
f) $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$.

- 389.— a) $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$,
b) $4\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 5\text{H}_2\text{O}$,
c) $3\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 4\text{H}_2\text{O}$,
d) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$,
e) $\text{FeSO}_4 \cdot \text{H}_2\text{O}$,
f) $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$.

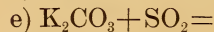
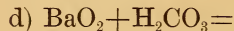
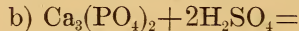
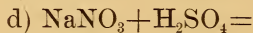
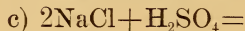
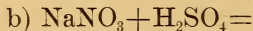
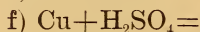
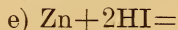
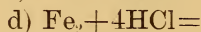
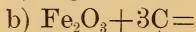
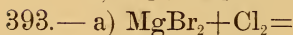
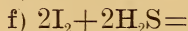
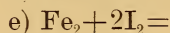
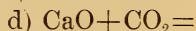
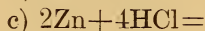
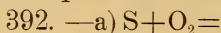
- 390.— a) $\text{Zn}(\text{C}_6\text{H}_5\text{SO}_4)_2 \cdot \text{H}_2\text{O}$,
b) $\text{ZnCO}_3 \cdot 2\text{Zn}(\text{OH})_2 \cdot \text{H}_2\text{O}$,
c) $\text{Fe}_3(\text{AsO}_4)_2$,
d) $\text{SbCl}_3 \cdot 5\text{Sb}_2\text{O}_3$.

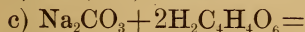
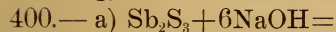
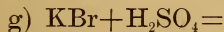
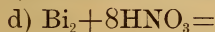
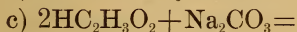
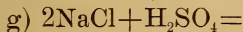
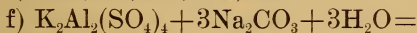
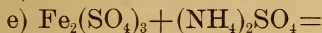
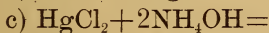
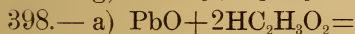
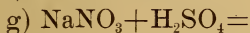
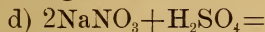
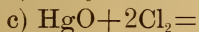
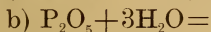
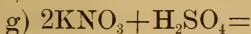
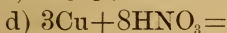
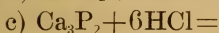
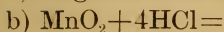
- 391.— a) $4\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 4\text{H}_2\text{O}$,
b) K_2HAsO_3 ,
c) $\text{BiC}_6\text{H}_5\text{O}_7$,
d) CaS_2O_3 ,
e) $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$,
f) $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$.

PART VII.

CHEMICAL EQUATIONS.

Complete the following equations:—



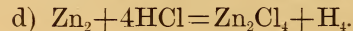
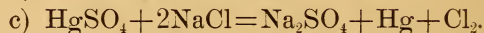
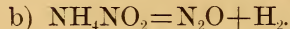
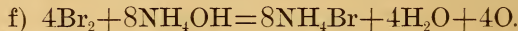
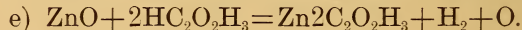
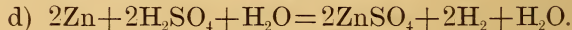
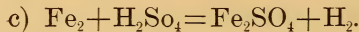
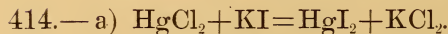
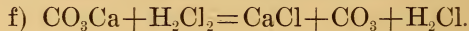
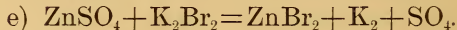
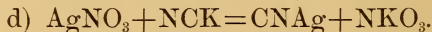
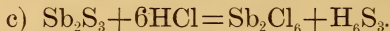
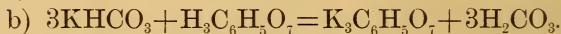
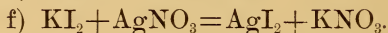
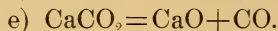
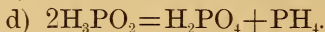
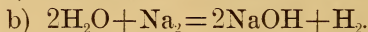
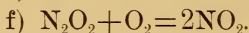
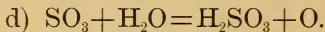
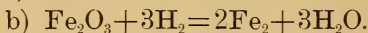
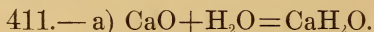


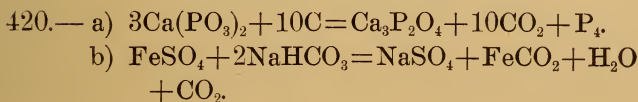
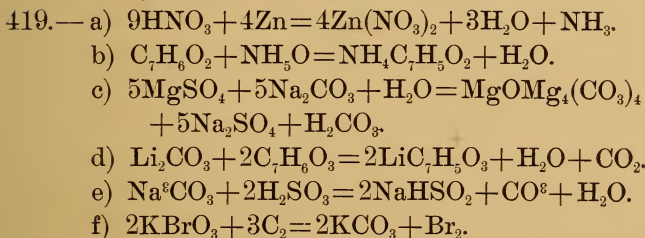
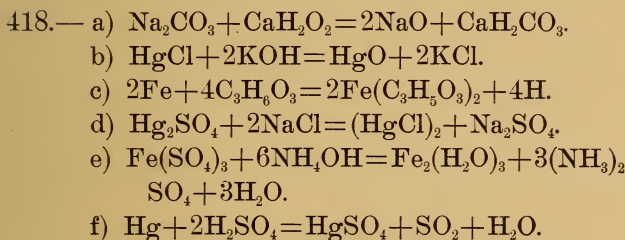
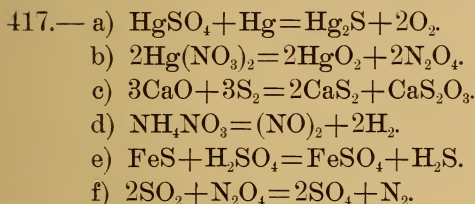
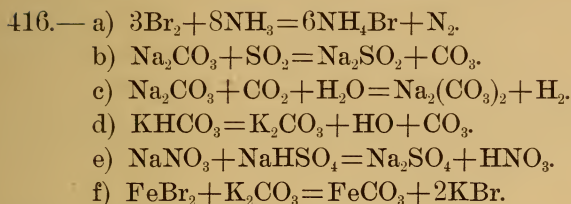
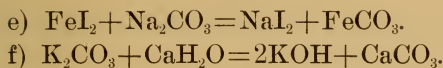
- e) $\text{NaHC}_4\text{H}_4\text{O}_6 + \text{KClO}_3 =$
 f) $2\text{KI} + \text{Pb}(\text{NO}_3)_2 =$
 g) $\text{FeBr}_2 + \text{Na}_2\text{CO}_3 =$
 401.— a) $3\text{I}_2 + 6\text{KOH} =$
 b) $2\text{HNO}_3 + \text{As}_2\text{O}_3 =$
 c) $2\text{Na}_3\text{SbO}_3 + 3\text{H}_2\text{SO}_4 =$
 d) $3\text{Cl}_2 + 6\text{KOH} =$
 e) $2\text{KI} + (\text{NH}_4)_2\text{SO}_4 =$
 f) $2\text{HNO}_3 + \text{C}_6\text{H}_{10}\text{O}_5 =$
 g) $\text{CaCl}_2 + \text{Na}_2\text{CO}_3 =$
 402.— a) $4\text{KHCO}_3 + \text{As}_2\text{O}_3 =$
 b) $2\text{NaC}_5\text{H}_9\text{O}_2 + \text{ZnSO}_4 =$
 c) $5\text{Na}_2\text{CO}_3 + 5\text{ZnSO}_4 + 3\text{H}_2\text{O} =$
 d) $2\text{Hg}(\text{NO}_3)_2 + 2\text{Hg} =$
 e) $\text{FeSO}_4 + \text{Na}_2\text{CO}_3 =$
 f) $\text{CaCO}_3 + 2\text{HBr} =$
 403.— a) $\text{FeBr}_2 + \text{Li}_2\text{CO}_3 =$
 b) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O} + 2\text{HCl} =$
 c) $3\text{P}_4 + 20\text{HNO}_3 + 8\text{H}_2\text{O} =$
 d) $\text{PbSO}_4 + \text{PbS} =$
 e) $\text{CaH}_4(\text{PO}_4)_2 =$
 f) $2\text{H}_2\text{SO}_4 + \text{Hg} =$
 404.— a) $2\text{Na}_3\text{SbS}_3 + 3\text{H}_2\text{SO}_4 =$
 b) $\text{NH}_4\text{HCO}_3\text{NH}_4\text{NH}_2\text{CO}_2 + 3\text{HC}_2\text{H}_3\text{O}_2 =$
 c) $\text{Ca}(\text{H}_2\text{PO}_2)_2 + \text{Na}_2\text{CO}_3 =$
 d) $\text{Ca}_3(\text{PO}_4)_2 + 2\text{H}_2\text{SO}_4 =$
 e) $\text{Ca}(\text{OCl})_2 + \text{CaCl}_2 + 2\text{Na}_2\text{CO}_3 =$
 f) $\text{Al}_2\text{F}_6 + 6\text{NaF} + 6\text{CaCO}_3 =$
 405.— a) $\text{As}_2\text{O}_3 + 2\text{NaNO}_3 + \text{Na}_2\text{CO}_3 =$
 b) $\text{Ca}(\text{H}_2\text{PO}_2)_2 + \text{K}_2\text{CO}_3 =$
 c) $\text{K}_4\text{Fe}(\text{CN})_6 + \text{K}_2\text{CO}_3 =$
 d) $\text{NH}_4\text{HCO}_3\text{NH}_4\text{NH}_2\text{CO}_2 + 3\text{HNO}_3 =$

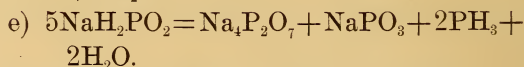
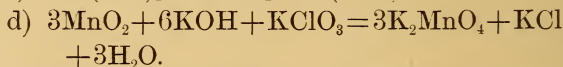
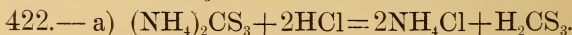
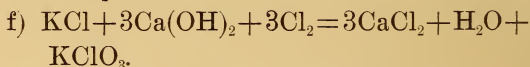
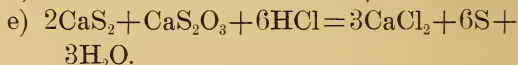
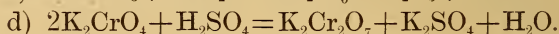
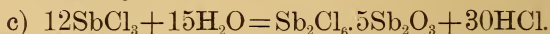
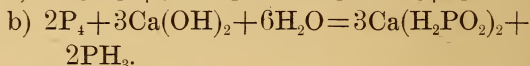
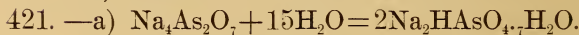
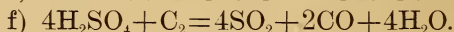
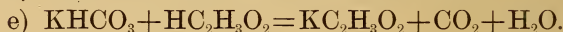
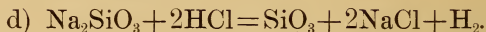
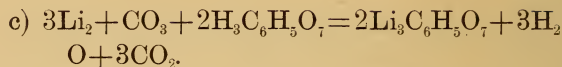
- e) $2\text{Fe}_2(\text{OH})_6 + \text{As}_2\text{O}_3 =$
 f) $\text{HC}_7\text{H}_5\text{O}_3 + \text{Na}_2\text{CO}_3 =$
- 406.— a) $2\text{HC}_7\text{H}_5\text{O}_2 + \text{Na}_2\text{CO}_3 =$
 b) $2\text{KHC}_4\text{H}_4\text{O}_6 + \text{Na}_2\text{CO}_3 =$
 c) $5\text{Bi}(\text{NO}_3)_3 + 8\text{H}_2\text{O} =$
 d) $3\text{PbO} + 3\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 =$
 e) $\text{Ca}(\text{H}_2\text{PO}_2)_2 + \text{FeSO}_4 =$
 f) $\text{NaCl} + \text{NH}_3 + \text{CO}_2 + \text{H}_2\text{O} =$
- 407.— a) $\text{Na}_2\text{SO}_4 + \text{CaCO}_3 + \text{C}_4 =$
 b) $\text{K}_2\text{S}_3 + \text{CuSO}_4 =$
 c) $\text{NaCl} + \text{NaHSO}_4 =$
 d) $\text{HNO}_3 + 3\text{HCl} =$
 e) $\text{HgSO}_4 + \text{Hg} + 2\text{NaCl} =$
 f) $\text{Ca}(\text{ClO}_3)_2 + 2\text{KCl} =$
- 408.— a) $\text{NaC}_2\text{H}_3\text{O}_2 + \text{H}_2\text{SO}_4 =$
 b) $\text{Ca}_3(\text{PO}_4)_2 + 2\text{H}_2\text{SO}_4 =$
 c) $2\text{K}_2\text{MnO}_4 + \text{Cl}_2 =$
 d) $3\text{HNO}_3 + \text{C}_6\text{H}_{10}\text{O}_5 =$
 e) $\text{BiONO}_3 \cdot \text{H}_2\text{O} + \text{H}_3\text{C}_6\text{H}_5\text{O}_7 =$
 f) $\text{K}_2\text{Cr}_2\text{O}_7 + 2\text{H}_2\text{SO}_4 =$
- 409.— a) $2\text{SbCl}_3 \cdot 5\text{Sb}_2\text{O}_3 + 6\text{NH}_3 + 3\text{H}_2\text{O} =$
 b) $\text{CaS}_2\text{O}_3 + \text{Na}_2\text{SO}_4 =$
 c) $2\text{FeOCr}_2\text{O}_3 + 4\text{K}_2\text{CO}_3 + 7\text{O} =$
 d) $3\text{K}_2\text{MnO}_4 + 3\text{H}_2\text{O} =$
 e) $6\text{KCN} + \text{FeCO}_3 =$
 f) $\text{HNO}_3 + \text{C}_6\text{H}_{10}\text{O}_5 =$
- 410.— a) $4\text{NH}_4\text{Cl} + 2\text{CaCO}_3 =$
 b) $\text{CaH}_4(\text{PO}_4)_2 + \text{Na}_2\text{CO}_3 =$
 c) $3\text{K}_2\text{CO}_3 + 4\text{S}_2 =$
 d) $2\text{NaI} + 2\text{H}_2\text{SO}_4 + \text{MnO}_2 =$
 e) $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 + \text{ZnSO}_4 =$
 f) $2\text{KHC}_4\text{H}_4\text{O}_6 + \text{K}_2\text{CO}_3 =$

ERRORS TO CORRECT.

Correct any errors you may find in the following equations:—







PART VIII.

SYNTHETICAL PROBLEMS IN PHARMACEUTICAL CHEMISTRY.

423.—How much oxygen is contained in one pound mercuric oxide?

424.—How much oxygen, by weight, can be obtained by heating 100 Gm KClO_3 ? How much will that oxygen measure? What is the residue?

425.—What amount of hydrogen, by weight, can be obtained from 32 troy ounces of water?

426.—How much hydrogen gas, by measure, will be obtained from 1 kilogram diluted sulphuric acid by means of zinc?

427.—How much zinc will be required to displace the hydrogen from 1 kilogram diluted sulphuric acid, and how much crystallized zinc sulphate will be obtained?

428.—How much zinc chloride can be made from one pound of zinc, and how much diluted hydrochloric acid is required?

429.—How much manganese di-oxide is consumed in generating 100 Gm chlorine gas? And how much diluted hydrochloric acid?

430.—What is the weight of the chlorine gas absorbed by one liter of water, if the water takes up 1.75 volumes?

431.—How much HCl can be obtained from 100 ounces

of NaCl , and how much H_2SO_4 is required to decompose the salt? And how much sodium sulphate, counted as crystallized salt, remains?

432.—How much HNO_3 is obtained from one pound of sodium nitrate; and how much sulphuric acid will be required to decompose that amount of nitrate?

433.—How much diluted (U. S. P.) sulphuric acid can be made from one liter concentrated sulphuric acid of 1.835 sp. gr.?

434.—How much phosphorus is contained in 10 pounds of the official phosphoric acid? And how much nitric acid is required to oxidize that amount of phosphorus to phosphoric acid?

435.—How much sulphurous anhydride is obtained from 100 Gm official sulphuric acid by heating with charcoal?

436.—How much official acetic acid can be obtained from one pound of sugar of lead? How much sulphuric acid is required to decompose that amount of the sugar of lead, and what will be the weight of the lead sulphate?

437. How much of the official hydrocyanic acid can be made from 100 Gm ferrocyanide of potassium, and how much sulphuric acid will be required?

438.—What is the percentage of boric acid in borax?

439.—What is the percentage of chromic acid in potassium bichromate?

440.—How much potassium citrate can be made from 50 Gm citric acid, and how much potassium bicarbonate is required for it?

441.—What is the amount of bromine in one ounce of the diluted hydrobromic acid?

442.—How much bromine is contained in one ounce potassium bromide?

443.—What is the percentage of NO_3 in HNO_3 ?

444.—What is the percentage of PO_4 in the official phosphoric acid?

445.—What is the percentage H_3PO_4 in phosphate of sodium?

446.—How much sodium bicarbonate is required to neutralize one drachm salicylic acid?

447.—How much chloride of silver will be obtained from 10 Gm official hydrochloric acid by precipitation with silver nitrate?

448.—What is the percentage of iron in Vallet's Mass? In Saccharated Carbonate of Iron? In Tincture of Chloride of Iron? In Griffith's Mixture?

449.—How much arsenous oxide corresponds in percentage of As to 1 Gm Solution of Arsenate of Sodium?

450.—How much arsenous oxide corresponds in percentage of As to 1 C.c. Fowler's Solution?

451.—How much combined iron is contained in 100 grains each of:—

a) solution of normal ferric sulphate?

b) solution of ferric nitrate?

c) solution of ferric chloride?

d) solution of ferric acetate?

e) saccharated iodide of iron?

f) official ferric chloride?

452.—How much ferrous chloride could be made from the amount of iron contained in one pound solution of ferric chloride?

453.—How much normal ammonium acetate is contained in the official solution?

454.—How much KOH corresponds to 100 Gm K_2CO_3 ? and how much $KHCO_3$ is required to make one pound of a $33\frac{1}{3}$ per cent. solution of potassium hydrate?

455.—How much sodium hydrate will replace 100 Gm KOH in precipitating mercuric oxide?

456.—How much of the official solution of subacetate of lead contains the same amount of lead as contained in 100 Gm normal lead acetate?

457.—How much $Fe_2(OH)_6$ will be obtained: a) from one pound official solution of normal ferric sulphate? b) from one pound ferric chloride?

458.—How much mercuric oxide is obtained from one pound mercuric chloride?

459.—What is the percentage of iodine in mercurous iodide?

460.—How much potassium iodide is theoretically required to decompose 100 Gm mercuric chloride?

461.—How much solution of ferric chloride is required to yield the same amount of ferric hydrate that will be furnished by 10 pounds solution of normal ferric sulphate?

462.—How much of the official water of ammonia will be theoretically required to precipitate the ferric hydrate from: a) one pound solution of tersulphate of iron? b) from one pound solution of ferric chloride? c) from a solution made from one pound of the official ferric chloride?

463.—What is the percentage of combined iron in: a) citrate of iron? b) citrate of iron and ammonium? c) tartrate of iron and ammonium?

464.—What are the proportions of ammonium sulphate and solution of normal ferric sulphate required to make 100 parts iron alum, and how much of the water will remain after the water of crystallization of the double salt has been taken from the solution of normal ferric sulphate?

465.—How much ferric hydrate is required to saturate 100 parts potassium bitartrate in preparing tartrate of iron and potassium?

466.—How much ferric oxide will be obtained by igniting 100 parts ferrous oxalate?

467.—How much anhydrous ferrous chloride will be obtained by saturating 100 parts HCl with iron?

468.—What is the percentage of combined iron in:—

- a) Fe_2O_3 , b) Fe_2Cl_6 , c) $\text{Fe}_2(\text{OH})_6$,
d) $\text{FeSO}_4 \cdot \text{H}_2\text{O}$, e) $\text{Fe}_2(\text{SO}_4)_3$?

469.—What is the percentage of chlorine in:—

- a) HgCl_2 , b) Hg_2Cl_2 , c) HCl,
d) NaCl, e) $\text{Fe}_2\text{Cl}_6 \cdot 12\text{H}_2\text{O}$, f) FeCl_2 ?

470.—What is the percentage of iodine in:—

- a) HgI_2 , b) Hg_2I_2 c) KI,
d) FeI_2 , e) Fe_2I_6 ?

471.—How much combined mercury is contained in:
a) $\frac{2}{3}\text{HgO}$, b) NH_2HgCl , c) $\text{Hg}(\text{CN})_2$, d) $(\text{HgO})_2\text{HgSO}_4$,
e) official solution of mercuric nitrate?

472.—How much $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ will be required to produce 100 parts $(\text{MgCO}_3)_4\text{Mg}(\text{OH})_2$?

473.—How much SO_2 can be obtained from 100 grains of:—a) $\text{K}_2\text{SO}_3 \cdot 2\text{H}_2\text{O}$, b) $\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O}$, c) NaHSO_3 ,
d) $\text{MgSO}_3 \cdot 6\text{H}_2\text{O}$, e) CaSO_3 ?

474.—How much $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$ can be made from 100 parts MnO_2 ?

475.—What is the percentage of morphine in:—a) the sulphate, b) the acetate, c) the hydrochlorate?

476.—What is the amount of:—a) combined iron contained in 100 grains of the official syrup of ferrous iodide? b) combined iodine?

477.—What is the amount of atropine contained in 100 grains of the sulphate?

478.—Find the percentage of bismuth in:—a) the subnitrate, b) the subcarbonate, c) the citrate, d) the ammonio-citrate?

479.—How much combined Br is contained in 100 Gm of:—a) HBr, b) KBr, c) LiBr, d) FeBr_2 , e) official syrup of bromide of iron?

480.—How much CaCl_2 can be prepared from 100 parts CaCO_3 , and how much official hydrochloric acid will be required?

481.—How much crystallized pyrophosphate of sodium may theoretically be made from 100 parts $\text{Ca}_3(\text{PO}_4)_2$?

482.—What is the percentage of benzoic acid in each of the benzoates of:—a) sodium, b) lithium, c) ammonium?

483.—How much chlorine water corresponds, in amount of Cl, to: a) 1 lb solution of chlorinated soda, b) 1 lb chlorinated lime?

484.—What is the percentage of sulphur in:—a) sulphurated potassa, b) sulphurated lime?

485.—How much CHCl_3 may be obtained from 100 parts chloral hydrate?

486.—What is the proportion of ferric phosphate in the official phosphate of iron, U.S.P., 1880?

487.—How much precipitated ferric pyrophosphate

can be made from 100 parts of the official solution of normal ferric sulphate?

488.—How much monohydrated quinine can be obtained from 100 grains of each of: a) trihydrated quinine, b) the official sulphate, c) bisulphate, d) hydrobromate, e) valerate, f) hydrochlorate?

489.—What is the percentage of tartaric acid in:—a) cream of tartar, b) Rochelle salt?

490.—How much potassa alum is required to make 100 parts aluminium hydrate?

491.—How much NH_3 can be obtained from 100 parts NH_4Cl ?

492.—How much N_2O , by weight and by volume, can be obtained by the decomposition of 100 Gm of NH_4NO_3 ?

493.—How much CO_2 , by weight and by volume, can be obtained from: a) 1,000 Gm CaCO_3 ; b) 1,000 Gm NaHCO_3 ; and c) how much water can be saturated by that gas under the pressure of four atmospheres?

494.—How much sulphuric acid containing 96 per cent. H_2SO_4 , and how much official stronger water of ammonia are required to make 100 parts $(\text{NH}_4)_2\text{SO}_4$?

495.—How much Sb_2O_3 and cream of tartar are required to make one pound tartar emetic?

496.—How much HCl will be consumed in generating enough Cl from HCl and MnO_2 to saturate one pint of water?

497.—How much AgNO_3 and KI are required to make one ounce Ag_2O ?

498.—How much Ag is contained in 16 ounces AgNO_3 ?

499.—How much Ag_2O can be obtained from 1 ounce AgNO_3 ?

500.—How much $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$ and how much $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$ can be made from 1,000 parts PbO ?

501.—What quantities of $\text{Pb}(\text{NO}_3)_2$ and KI are required to make 1,000 parts PbI ?

502.—What quantities of official nitric acid and PbO are required to make 10 lbs. $\text{Pb}(\text{NO}_3)_2$?

503.—How much CO_2 and how much K_2CO_3 can be obtained from 100 Gm KHCO_3 ?

504.—How much official acetic acid and KHCO_3 are required to make ten pounds $\text{KC}_2\text{H}_3\text{O}_2$?

505.—How much $\text{K}_2\text{Cr}_2\text{O}_7$ and KHCO_3 are required to make 100 parts K_2CrO_4 ?

506.—How much BrFe and official ammonium carbonate are required to make 100 pounds NH_4Br , first making ferroso-ferric bromide and then decomposing that with NH_4OH ?

507.—What is the percentage of citric acid in:—
a) potassium citrate, b) sodium citrate, c) ammonium citrate?

508.—What amount of HCN can be obtained from 100 grains KCN ?

509.—How much O is given up by 100 grains $\text{K}_2\text{Mn}_2\text{O}_8$ when reduced by tannin?

510.—How much of each of the following named salts correspond in saturating power to 100 Gm NaOH :—
a) Na_2HCO_3 , b) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$, c) NaHCO_3 , d) air-dried sodium carbonate?

511.—How much official acetic acid and $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ are required to make 100 Gm sodium acetate?

512.—How much H_3BO_3 can be obtained from 10 lbs. borax?

513.—How much P and $\text{Ca}(\text{OH})_2$ are required for making 1,000 Gm $\text{Ca}(\text{PH}_2\text{O}_2)_2$?

514.—What percentage of H_3PO_4 is represented by $\text{CaH}_4(\text{PO}_4)_2$?

515.—What materials are required for making 100 lbs. $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ from bone ash, etc.?

516.—What percentage of $\text{H}_2\text{C}_7\text{H}_4\text{O}_3$ is represented by:—a) sodium salicylate, b) lithium salicylate?

517.—What materials are required for making 100 parts zinc sulphocarbolate from phenol, etc.?

518.—How much acetic acid containing 36 per cent. $\text{HC}_2\text{H}_3\text{O}_2$ is required to convert into zinc acetate:—a) 100 parts zinc carbonate, b) 100 parts zinc oxide?

519.—How much Zn and official hydrochloric acid are required to make 1,000 Gm ZnCl_2 ?

520.—What other materials are necessary to make 100 parts zinc valerate from $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$?

521.—How much I and Zn are required to make 1 ounce ZnI_2 ?

522.—How much ZnO can be made from:—a) 1,000 Gm $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$? b) 1,000 Gm Zinc carbonate?

PART IX.

PHARMACEUTICAL NOMENCLATURE.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

ELEMENTS.

- 523.—Chlorine; Iodine; Bromine.
- 524.—Sulphur; Phosphorus; Carbon.
- 525.—Arsenic; Antimony; Bismuth.
- 526.—Zinc; Lead; Copper.
- 527.—Gold; Silver; Mercury.
- 528.—Manganese; Iron.

ACIDS.

- 529.—Acid; Acids.
- 530.—Acetic Acid; Diluted Acetic Acid; Glacial Acetic Acid.
- 531.—Valeric Acid; Oleic Acid; Lactic Acid.
- 532.—Oxalic Acid; Tartaric Acid; Citric Acid.
- 533.—Pure Phenol; Crude Phenol; Picric Acid; Salicylic Acid; Benzoic Acid.
- 534.—Tannic Acid; Gallic Acid.
- 535.—Hydrochloric Acid; Hydrobromic Acid; Hydriodic Acid; Hydrocyanic Acid; Nitrohydrochloric Acid; Diluted Hydrochloric Acid.
- 536.—Nitric Acid; Diluted Nitric Acid; Sulphuric Acid; Aromatic Sulphuric Acid; Phosphoric Acid.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

537.—Carbonic Acid; Boric Acid.

538.—Arsenous Anhydride; Chromic Anhydride; Sulphurous Anhydride.

OXIDES, HYDRATES, SALTS, ETC.

539.—Water; Potassium Hydrate; Sodium Hydrate; Ammonia.

540.—Lime; Magnesia; Zinc Oxide.

541.—Lead Oxide; Silver Oxide.

542.—Red Oxide of Mercury; Yellow Oxide of Mercury.

543.—Aluminium Hydrate; Black Oxide of Manganese; Antimonious Oxide.

544.—Oxide; Hydrate.

545.—Chloride; Iodide; Bromide; Cyanide.

546.—Sulphide; Phosphide.

547.—Nitrate; Nitrites.

548.—Chlorate; Hypochlorite.

549.—Sulphate; Sulphite; Hyposulphite.

550.—Phosphate; Pyrophosphate; Hypophosphite.

551.—Borate; Silicate; Carbonate; Bicarbonate.

552.—Permanganate; Chromate; Arsenate; Arsenite.

553.—Acetate; Valerate; Oleate; Lactate.

554.—Oxalate; Tartrate; Bitartrate; Citrate.

555.—Picrate; Salicylate; Benzoate.

556.—Tannate; Santoninate.

CHLORIDES.

557.—Potassium, Sodium, Lithium and Ammonium Chloride.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

558.—Barium, Calcium, Magnesium and Zinc Chloride.

559.—Calomel; Corrosive Sublimate.

560.—Ferrous Chloride; Ferric Chloride.

561.—Chloride of Antimony; Oxychloride of Antimony; Chloride of Gold and Sodium.

IODIDES.

562.—Potassium, Sodium, and Ammonium Iodide.

563.—Calcium Iodide; Zinc and Cadmium Iodide.

564.—Lead and Silver Iodide.

565.—Green Iodide of Mercury; Red Iodide of Mercury.

566.—Iodide of Iron; Iodide of Arsenic; Saccharated Iodide of Iron.

BROMIDES.

567.—Potassium, Sodium, Lithium and Ammonium Bromide.

568.—Calcium, Magnesium, and Iron Bromide.

CYANIDES.

569.—Potassium, Silver, Mercury, and Zinc Cyanide.

570.—Ferrocyanide of Potassium; Ferrocyanide of Iron.

SULPHIDES.

571.—Potassium, Sodium, and Ammonium Sulphide.

572.—Mercury, Iron, and Antimony Sulphide.

573.—Sulphurated Potassa; Sulphurated Lime; Sulphurated Antimony.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

NITRATES.

574.—Potassium, Sodium, and Ammonium Nitrate; Barium Nitrate.

575.—Lead, Copper, Silver, and Mercury Nitrate.

576.—Nitrate of Iron; Subnitrate of Bismuth.

SULPHATES.

577.—Potassium, Sodium, and Ammonium Sulphate.

578.—Calcium, Magnesium, Zinc, and Cadmium Sulphate.

579.—Copper, and Manganese Sulphate.

580.—Sulphate of Mercury; Yellow Sulphate of Mercury.

581.—Aluminium Sulphate; Aluminium and Potassium Sulphate; Aluminium and Ammonium Sulphate.

582.—Alum; Dried Alum.

583.—Ferrous Sulphate; Dried Ferrous Sulphate; Precipitated Ferrous Sulphate.

584.—Normal Ferric Sulphate; Basic Ferric Sulphate; Iron Alum.

SULPHITES.

585.—Potassium, Sodium, Calcium, and Magnesium Sulphite.

PHOSPHATES.

586.—Sodium, and Ammonium Phosphate.

587.—Precipitated Phosphate of Calcium.

588.—Blue Phosphate of Iron; White Phosphate of Iron; Soluble Phosphate of Iron.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

* PYROPHOSPHATES.

589.—Pyrophosphate of Sodium; Precipitated Pyrophosphate of Iron; Soluble Pyrophosphate of Iron.

HYPOPHOSPHITES.

590.—Potassium, Sodium, Lithium, and Ammonium Hypophosphite.

591.—Calcium, Magnesium, Manganese, and Iron Hypophosphite.

CARBONATES.

592.—Potassium Carbonate; Sodium Carbonate; Dried Sodium Carbonate.

593.—Lithium Carbonate; Ammonium Carbonate.

594.—Precipitated Calcium Carbonate; Magnesium Carbonate; Zinc Carbonate.

595.—Lead Carbonate; Subcarbonate of Iron; Saccharated Carbonate of Iron; Subcarbonate of Bismuth.

596.—Bicarbonate of Potassium; Bicarbonate of Sodium.

ACETATES.

597.—Potassium, Sodium, and Ammonium Acetate.

598.—Zinc, Lead, and Copper Acetate.

599.—Acetate of Iron; Subacetate of Copper.

MISCELLANEOUS.

600.—Phosphide of Zinc; Nitrite of Potassium.

601.—Hypochlorite of Potassium; Hyposulphite of Sodium.

602.—Borax; Potassium Permanganate; Chromate and Bichromate of Potassium.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

603.—Arsenate of Sodium; Arsenate of Iron; Arsenite of Potassium; Arsenite of Copper.

604.—Sodium, and Ammonium Valerate; Ferrous Lactate; Zinc Lactate.

605.—Oleate of Mercury; Oleate of Zinc; Oleate of Lead.

606.—Oxalate of Iron; Succinate of Ammonium; Sulphocarbolate of Zinc.

607.—Potassium Tartrate; Potassium and Sodium Tartrate; Potassium Bitartrate; Tartrate of Antimony and Potassium.

608.—Tartrate of Iron and Potassium; Tartrate of Iron and Ammonium.

609.—Citrate of Potassium; Citrate of Lithium; Citrate of Ammonium; Citrate of Magnesium.

610.—Citrate of Iron; Citrate of Iron and Ammonium; Citrate of Iron and Quinine; Citrate of Iron and Strychnine.

611.—Ammonium Picrate; Sodium Salicylate; Ammonium Benzoate; Santoninate of Sodium.

612.—Mercury with Chalk; Potassa with Lime.

ADJECTIVES.

613.—Washed Sulphur; Purified Mercury; Iodized Starch.

614.—Purified Sulphide of Antimony; Diluted Nitrate of Silver; Fused Nitrate of Silver.

615.—Prepared Chalk; Saccharated Carbonate of Iron; Saccharated Iodide of Iron.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

616.—Hydrated Oxide of Iron with Magnesia; Reduced Iron.

617.—Corrosive Chloride of Mercury; Mild Chloride of Mercury.

618.—Red Iodide of Mercury; Green Iodide of Mercury; Ammoniated Mercury.

619.—Granulated Citrate of Magnesium; Granulated Zinc.

620.—Sulphurated Potassa; Sulphurated Lime; Sulphurated Antimony.

621.—Crude Carbolic Acid; Commercial Bicarbonate of Sodium.

622.—Fused Nitrate of Silver; Fused Chloride of Calcium; Fused Chloride of Zinc.

623.—Calcined Bone; Burnt Alum; Burnt Magnesia; Sublimed Sulphur.

624.—Dialysed Iron; Pure Zinc; Pure Carbonate of Potassium.

625.—Crystallized Nitrate of Silver; Crystallized Sulphide of Mercury.

626.—Heavy Magnesia; Resublimed Iodine.

627.—Precipitated Oxide of Mercury; Precipitated Sulphate of Iron.

ORGANIC CHEMICALS.

628.—Quinine; Strychnine; Morphine; Veratrine.

629.—Salicin; Santonin; Aloin; Saponin; Elaterin; Picrotoxin; Piperin; Lupulin.

630.—Ether; Acetic Ether; Stronger Ether.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

631.—Alcohol; Diluted Alcohol; Amylic Alcohol; Absolute Alcohol.

632.—Creasote; Glycerin; Starch; Sugar; Milk Sugar; Pepsin.

633.—Chloral; Chloroform; Iodoform; Amyl Nitrite; Ethereal Oil of Wine.

ALKALOIDAL SALTS.

634.—Quinine Sulphate; Morphine Acetate; Hyoscyamine Salicylate.

635.—Quinine Hydrobromate; Morphine Hydrochlorate.

636.—Physostigmine Salicylate; Hyoscyamine Sulphate.

637.—Cocaine Hydrochlorate; Strychnine Nitrate.

638.—Homatropine Bromide; Apomorphine Chloride; Quinine Bisulphate.

SOLUTIONS, ETC.

639.—Solution of Arsenous Acid; Syrup of Hydriodic Acid.

640.—Solution of Acetate of Ammonium; Solution of Chloride of Iron.

641.—Lime Water; Solution of Potassa; Solution of Soda.

642.—Compound Solution of Iodine; Solution of Chlorinated Soda.

643.—Solution of Citrate of Potassium; Solution of Subacetate of Lead; Solution of Tersulphate of Iron.

Write in full the nominative and genitive of the pharmacopœial latinic titles of:—

644.—Solution of Iodide of Arsenic and Mercury; Solution of Citrate of Iron and Quinine.

645.—Solution of Arsenite of Potassium; Solution of Silicate of Sodium; Solution of Chloride of Zinc.

Write the correct pharmaceutical American titles of:—

646.—Kalium; Natrium; Stibium.

647.—Argentum; Plumbum; Hydrargyrum; Aurum.

648.—Cuprum; Manganum; Arsenum; Carboneum.

649.—Acidum Phenylicum; Acidum Carbazoticum; Acidum Azoticum.

650.—Acidum Muriaticum; Acidum Prussicum; Acidum Hydrocyanicum.

651.—Acidum Hydrochloratum; Acidum Hydrobromatum; Acidum Hydrocyanatum.

652.—Acidum Boricum; Oxidum Arseniosum.

653.—Zinci Oxidum; Plumbum Oxydatum; Oxidum Calcicum.

654.—Ferrum Oxydatum Saccharatum Solubile.

655.—Hydrargyrum Oxydatum Rubrum; Antimoni-
osum Oxidum.

656.—Hydras Kalicus; Natricus Hydras.

657.—Hydras Ferricus; Aluminii Hydras.

658.—Oxidum Magnesium; Argenticum Oxidum; Ferri Oxidum Magneticum.

659.—Ammonium Chloratum; Kalium Iodatum; Natrium Bromatum.

660.—Ferrum Sesquichloratum; Chloretum Ferri-
cum; Chloruretum Ferricum.

661.—Ferri Chloridum; Ferricum Chloridum.

662.—Ferrosus Chloridum; Ferri Chloridum Viride.

663.—Hydrargyrosus Chloridum; Hydrargyricus
Iodidum.

664.—Hydrargyri Bichloridum; Hydrargyri Sub-
chloridum.

665.—Ferrum Sulfuricum Oxydatum; Chininum
Ferro-citricum.

666.—Hydrargyrum Bichloratum; Hydrargyrum Bi-
jodatum.

667.—Ferri Perchloridum; Ferrosus Iodidum.

668.—Chloretum Stibicum; Kalium Cyanatum.

669.—Calomel; Potassa; Calcaria Usta; Alumen
Ustum.

670.—Calx Vivum; Magnesia Levis; Magnesia Usta.

671.—Hydratocarbonas Magnesicus; Chloreto-Ami-
detum Hydrargyricum.

672.—Chloridum Natricum; Potassicum Cyanidum.

673.—Nitras Kalicus; Kalium Nitricum; Potassii
Nitras; Potassicus Nitras.

674.—Chloras Kalicus; Kalium Chloricum; Sodicus
Chloras.

675.—Sulphas Zincicus; Zincum Sulfuricum; Zinci-
cus Sulphas.

676.—Ferrosus Sulphas; Ferricus Sulphas; Ferricus
Subsulphas.

677.—Ferrosus Carbonas Saccharatus; Sodicus Bicar-
bonas; Bicarbonas Natricus.

678.—Natrium Phosphoricum; Sodii Biboras; Kalicus
Permanganas.

ERRORS TO CORRECT.

Correct all errors you can discover in the following titles:—

679.—Acidum Acetici Dilutus; Acidum Arsenosum.

680.—Acidum Boracicus; Acidum Cromicum; Acidum Hydribromicum.

681.—Acidum Phosforicum; Acidum Sulfurosum; Acidum Salycilicum.

682.—Ether Aceticum; Ether Fortior; Alcohol Dilutus.

683.—Alumen Exsicatus; Alumini Sulphas; Amonii Carbonas.

684.—Amyli Nitris; Antimoni et Potassæ Tartras; Antimonum Sulphuratum.

685.—Aqua Ammonii; Aqua Chlorig; Argenti Nitras Fusum.

686.—Arsenii Iodidum; Atropiæ Sulphas; Auri et Sodæ Chloridum.

687.—Bismutii et Amonæ Citras; Calcis Carbonas Precipitata; Calci Hypophosphas.

688.—Calx Clorata; Carbonei Bisulfidum; Chloroformum Venalus.

689.—Cinchonidiæ Sulphas; Cræta Preparata; Feri Chloridum.

690.—Feri Oxidum Hydratus; Feri Sulphas Exicatum; Hydrargyri Chloridum Corosivus.

691.—Hydrargyri Chloridum Mitus; Hydrargyri Iodidum Viride.

692.—Hydrargyri Subsulphas Flava; Liquor Acidi Arseniosum; Liquor Ferri Acetas.

693.—Liquor Ferri Chloridum; Liquor Magnesiae Citras; Liquor Plumbii Subacetatis.

Correct all errors you can discover in the following titles:—

694.—Liquor Potasæ Arsenitis; Liquor Sodæ Chloratæ; Liquor Sodæ Arsenatis.

695.—Lithiæ Salycilas; Mangani Oxidum Nigrum; Mistura Ferri et Amoniae Acetas.

696.—Morphiæ Hydrochloras; Pepsina Sacharatum; Physostigmæ Salycilas.

697.—Picrotoxina; Piperina; Potassiae et Sodiae Tartras.

698.—Pyroxylina; Glycerina; Salicinum; Veratrina.

699.—Quinini Bisulphis; Quinini Murias; Quiniæ Bromidum.

700.—Santonina; Sodiae Acetas; Sodæ Bicarbonas Venale.

701.—Sodæ Carbonas Exsiccatum; Spiritus Ammonii Aromaticus; Strychnini Sulphas.

702.—Syrupus Acidi Hydroiodici; Syrupus Calcis Lactophosphatus; Syrupus Ferri Quiniæ et Strychnini Phosphatis.

703.—Syrupus Hypophosphitum; Tinctura Iodinii; Tinctura Gelseminum; Trochisi Ammoniae Chloridi.

704.—Trochisi Sodiae Santonatis; Unguentum Hydrargyri Oxidum Rubrum; Unguentum Sulphur Alkalinum.

Write the nominative and genitive, and the proper abbreviations, of the latinic titles of:—

705.—Herb, Herbs; Leaf, Leaves; Flower, Flowers; Fruit, Fruits; Seed, Seeds.

706.—Root, Roots; Tuber, Tubers; Rhizome, Rhizomes; Bulb, Bulbs; Corm, Corms.

Write the nominative and genitive, and the proper abbreviations, of the latinic titles of:—

707.—Bark, Barks; Stem, Stems; Twig, Twigs; Top, Tops; Gland, Glands.

708.—Gum; Starch; Fixed Oil, Fixed Oils; Volatile Oil, Volatile Oils.

709.—Resin, Resins; Gum-Resin, Gum-Resins; Oleoresin, Oleoresins.

710.—Species; Powder, Powders; Compound Powder.

711.—Trituration, Triturations; Abstract, Abstracts.

712.—Extract, Extracts; Fluid Extract, Fluid Extracts; Powdered Extract, Powdered Extracts.

713.—Confection, Confections; Troche, Troches; Mass, Masses; Pill, Pills; Bolus, Boli.

714.—Granule, Granules; Capsule, Capsules; Jelly; Paste; Pastiles.

715.—Cataplasm, Cataplasms; Paper, Papers.

716.—Ointment, Ointments; Cerate, Cerates; Plaster, Plasters; Oleate, Oleates; Suppository, Suppositories.

717.—Solution, Solutions; Mixture, Mixtures; Water, Waters; Mucilage, Mucilages.

718.—Infusion, Infusions; Decoction, Decoctions; Compound Decoction, Compound Infusion.

719.—Emulsion, Emulsions; Syrup, Syrups; Glycerite, Glycerites.

720.—Spirit, Spirits; Tincture, Tinctures; Wine, Wines; Ethereal Tincture, Ammoniated Tincture, Compound Tincture.

721.—Vinegar, Vinegars; Collodion, Collodions; Liniment, Liniments.

722.—Injection, Injections; Lotion, Lotions; Gargle, Gargles.

Write the nominative and genitive, and the proper abbreviations, of the latinic titles of:—

723.—Vapor, Vapors; Inhalation, Inhalations; Hypodermatic Injection; Bath, Baths.

Write the nominative and genitive of the complete latinic and the nominative of the scientific American pharmacopœial titles of:—

724.—Gum Arabic, Tragacanth. Arrow-root, Malt, Honey.

725.—Castor Oil, Almond Oil, Cod Liver Oil, Cotton Seed Oil, Linseed Oil, Croton Oil, Cacao Butter, Fixed Oil of Nutmeg.

726.—Lard, Suet, Wax, Spermaceti.

727.—Volatile Oils of: Turpentine, Savine, Lavender, Lavender Flowers, Rosemary, Orange, Lemon, Bergamot, Cubeb.

728.—Volatile Oils of: Anise, Caraway, Fennel, Thyme, Peppermint, Pennyroyal, Sassafras, Star Anise, Cloves, Allspice, Wintergreen, Nutmeg.

729.—Volatile Oils of: Bitter Almond, Mustard.

730.—Camphor, Aloes, Opium, Catechu, Kino, Kamala.

731.—Ammoniac, Asafetida, Gamboge, Scammony, Myrrh.

732.—Wormwood, Aconite, Sweet Almonds, Bitter Almonds, Koussou, Ergot, Cloves.

733.—Barley, Quince Seed, Marshmallow Root, Irish Moss, Iceland Moss.

734.—Bitter Orange Peel, Sweet Orange Peel, Lemon Peel, Nutmeg.

Write the nominative and genitive of the complete latinic and the nominative of the scientific American pharmacopœial titles of:—

735.—Turpentine, Male Fern, Blue Flag, Sweet Flag, Ladies' Slipper, Snake Root, Ginger.

736.—Cayenne Pepper, Black Pepper, Hops, Yerba-Santa.

737.—Benzoin, Balsam of Tolu, Balsam of Peru, Storax.

738.—Jalap, Mandrake, Indian Hemp, Cotton Root Bark.

739.—Dandelion, Liquorice Root, Rhubarb, Yellow Dock.

740.—Culver's Root, Seneka Snake Root, Black Cohosh, Poke Root, Squill.

741.—Buckthorn Bark, Black Haw, Butternut Bark, Black Alder.

742.—Pipsissewa, Foxglove, Levantic Wormseed, German Wormseed.

743.—Fish-berries, Colocynth, Rhatany, Blackberry Root Bark, Oak Bark, Nutgall, Sumach.

744.—Deadly Nightshade, Belladonna Leaf, Belladonna Root.

745.—Henbane, Stinkweed, Hemlock Seed.

746.—Aconite Leaf, Calabar Bean, Colchicum Seed, American Hellebore.

747.—Blood Root, Jaborandi, Ipecac, Quebraccho, Pomegranate Root Bark.

748.—Pareira Brava, Broom, Golden Seal, Coca Leaves.

749.—Wild Cherry Bark, Black Mustard, White Mustard.

750.—Spanish Flies, Castor, Musk, Ox-gall, Leeches.

Write in full the correct latinic pharmacopœial titles of:—

751.—Abstract of Nux Vomica; Stronger Ammonia Water; Orange Flower Water.

752.—Chlorine Water; Simple Cerate; Cantharidal Cerate.

753.—Cerate of Extract of Cantharides; Nitrate of Potassium Paper; Cantharidal Collodion.

754.—Flexible Collodion; Styptic Collodion; Elixir of Orange.

755.—Ammoniac Plaster with Mercury; Galbanum Plaster.

756.—Isinglass Plaster; Burgundy Pitch Plaster, Canada Pitch Plaster; Soap Plaster.

757.—Aqueous Extract of Aloes; Extract of Arnica Root; Extract of Aconite Root.

758.—Aromatic Fluid Extract; Fluid Extract of Bitter Orange Peel; Alcoholic Extract of Belladonna.

759.—Extract of Indian Cannabis; Fluid Extract of Chestnut Leaves; Fluid Extract of Colchicum Seed.

760.—Fluid Extract of Cornus; Fluid Extract of Coca; Extract of Wahoo Bark.

761.—Extract of Yellow Jessamine; Extract of Logwood; Fluid Extract of Witch Hazel.

762.—Extract of Iris; Extract of Juglans; Fluid Extract of Matico.

763.—Extract of Calabar Bean; Fluid Extract of Wild Cherry; Fluid Extract of Rhus Glabra.

764.—Fluid Extract of Yellow Dock; Compound Fluid Extract of Sarsaparilla.

765.—Fluid Extract of American Hellebore; Inspisated Ox-gall.

Write in full the correct latinic pharmacopœial titles of:—

766.—Glycerite of Yolk of Egg; Blue Pill; Copaiba Pill.

767.—Compound Iron Mixture; Basham's Mixture; Dewee's Carminative.

768.—Brown Mixture; Neutral Mixture; Mixture of Rhubarb and Soda.

769.—Mucilage of Sassafras Pith; Oleoresin of Male Fern; Denarcotized Opium.

770.—Saccharated Pepsin; Compound Pills of Antimony; Pills of Aloes and Mastic.

771.—Antimonial Powder; Seidlitz Powder; Dover's Powder.

772.—Spirit of Ether; Spirit of Nitrous Ether; Sweet Spirit of Nitre.

773.—Syrup of Tar; Syrup of Raspberry; Syrup of Tolu.

774.—Tincture of Arnica Flowers; Tincture of Benzoin; Tincture of Kino.

775.—Camphorated Tincture of Opium; Deodorized Tincture of Opium; Sweet Tincture of Rhubarb.

776.—Tincture of Green Soap; Tincture of Sumbul; Tincture of Tolu; Tincture of Ginger.

777.—Troches of Morphine and Ipecac; Troches of Chlorate of Potassium.

778.—Cold Cream; Chrysarobin Ointment; Diachylon Ointment.

779.—Ointment of Ammoniated Mercury; Ointment of Carbonate of Lead.

780.—Stronger White Wine; Bitter Wine of Iron; Compound Cathartic Pills.

Write the official American titles, and the common vernacular names of the following named drugs, and state what plant parts constitute the drugs:—

781.—*Absinthium*, *Aconitum*, *Allium*, *Althæa*.

782.—*Anthemis*, *Apocynum*, *Asclepias*, *Aspidium*.

783.—*Azedarach*, *Brayera*, *Bryonia*, *Buchu*.

784.—*Calamus*, *Calendula*, *Calumba*, *Cambogia*.

785.—*Cannabis Americana*, *Cannabis Indica*, *Cantharis*.

786.—*Capsicum*, *Cardamomum*, *Carum*, *Caryophyllus*.

787.—*Cascarilla*, *Cassia Fistula*, *Castanea*, *Caulophyllum*.

788.—*Cetraria*, *Chelidonium*, *Chenopodium*, *Chimaphila*.

789.—*Chirata*, *Chondrus*, *Cimicifuga*, *Conium*.

790.—*Cornus*, *Crocus*, *Cydonium*, *Cypripedium*.

791.—*Digitalis*, *Dulcamara*, *Erythroxyton*, *Euonymus*.

792.—*Eupatorium*, *Ficus*, *Foeniculum*, *Frangula*.

793.—*Galla*, *Gaultheria*, *Gelsemium*, *Gentiana*.

794.—*Geranium*, *Glycyrrhiza*, *Gossypium*, *Granatum*.

795.—*Grindelia*, *Guarana*, *Hæmatoxyton*, *Hamamelis*.

796.—*Hedeoma*, *Humulus*, *Hydrastis*, *Hyoscyamus*.

797.—*Ignatia*, *Illicium*, *Inula*, *Ipecacuanha*.

798.—*Iris*, *Jalapa*, *Juglans*, *Juniperus*.

799.—*Kamala*, *Krameria*, *Lappa*, *Leptandra*.

800.—*Linum*, *Lobelia*, *Lupulinum*, *Lycopodium*.

801.—*Macis*, *Magnolia*, *Marrubium*, *Matico*.

802.—*Matricaria*, *Melissa*, *Menispermum*, *Mentha Viridis*.

803.—*Mezereum*, *Myristica*, *Nux Vomica*, *Origanum*.

804.—*Pareira*, *Pepo*, *Physostigma*, *Pilocarpus*.

805.—*Pimenta*, *Piper*, *Podophyllum*, *Prinos*.

Write the official American titles, and the common vernacular names of the following named drugs, and state what plant parts constitute the drugs:—

806.—*Prunum*, *Prunus Virginiana*, *Pulsatilla*.

807.—*Pyrethrum*, *Quassia*, *Quercus Alba*, *Quillaia*.

808.—*Rheum*, *Rhus Glabra*, *Rhus Toxicodendron*, *Rosa Centifolia*, *Rosa Gallica*.

809.—*Rosmarinus*, *Rubus*, *Rubus Idæus*.

810.—*Rumex*, *Sabina*, *Salix*, *Salvia*.

811.—*Sambucus*, *Sanguinaria*, *Santalum Rubrum*, *Santonica*.

812.—*Sarsaparilla*, *Sassafras*, *Sassafras Medulla*, *Scilla*.

813.—*Scoparius*, *Scutellaria*, *Senega*, *Senna*.

814.—*Serpentaria*, *Spigelia*, *Staphisagria*, *Stillingia*.

815.—*Stramonii Folia*, *Stramonii Semen*, *Sumbul*, *Tamarindus*.

816.—*Tanacetum*, *Taraxacum*, *Thuja*, *Triticum*.

817.—*Ulmus*, *Ustilago*, *Uva Ursi*, *Valeriana*, *Vanilla*.

818.—*Veratrum Viride*, *Viburnum*, *Viola Tricolor*, *Xanthoxylum*, *Zingiber*.

819.—*Aspidosperma*, *Asarum*, *Baptisia*, *Boldus*.

820.—*Cataria*, *Chelone*, *Chionanthus*, *Collinsonia*.

821.—*Aletris*, *Corydalis*, *Damiana*, *Delphinium*.

822.—*Dioscorea*, *Drosera*, *Epigæa*, *Eriodictyon*.

823.—*Fucus Vesiculosus*, *Geum*, *Gillenia*, *Gnaphalium*.

824.—*Helianthemum*, *Helonias*, *Hepatica*, *Heuchera*.

825.—*Juniperus Virginiana*, *Lactuca*, *Leonurus*, *Lycopus*.

826.—*Methysticum*, *Mitchella*, *Myrica*, *Oenothera*.

827.—*Phoradendron*, *Piscidia*, *Polymnia*, *Ptelea*.

Write the official American titles, and the common vernacular names of the following named drugs, and state what plant parts constitute the drugs:—

828.—*Rhamnus Purshiana*, *Rhus Aromatica*, *Senecio*.

829.—*Simaruba*, *Solidago*, *Spiræa*, *Symphytum*.

830.—*Trillium*, *Tussilago*, *Verbascum*, *Viburnum Opulus*.

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WITH ORIGINAL ILLUSTRATIONS.

(See next page.)

PREFACE.

OUR object in preparing this manual was to provide in convenient form a sufficient number of suitable lessons in laboratory work, and at the same time to embody in the book the facts of inorganic chemistry most important to pharmacy and medicine. It contains experiments intended to familiarize the student with the properties of the principal elements, lessons in synthetical chemistry, a systematic course in qualitative analysis, examples in quantitative determinations, including the official methods of assay for a few important drugs, and a short chapter on the chemical and microscopical examination of urine.

Among the lessons in Part II will be found the working formulæ of the pharmacopœias for many of the preparations.

Students pursuing synthetical work without an instructor can successfully and with benefit make most of the pharmaceutical preparations included in the Second Part, with the aid of the explanatory notes it contains. For purposes of practice the quantities of materials operated upon may, of course, be small and the outfit of apparatus limited to the list given in the appendix. The proportions of the materials are stated, sometimes in parts by weight, and sometimes in definite quantities expressed in terms of the metric system, which will afford useful practice in the application of both forms.

The portions devoted to analytical methods are necessarily much condensed, but believed to contain all that is essential in a work of this character.

THE AUTHORS.

CHICAGO, May, 1887.

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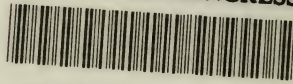
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